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**ANALYSIS OF THE PULL-UP REQUIREMENT
IN THE U.S. MARINE CORPS PHYSICAL FITNESS
TEST FOR FEMALE MARINES**

by

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March 2014

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PHYSICAL FITNESS TEST FOR FEMALE MARINES**

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ABSTRACT

The Marine Corps Physical Fitness Test (PFT) dates back to the 1950s. In its current state, it is said to evaluate all Marines' general fitness levels in the areas of strength, endurance, and mobility. In November 2012, the commandant of the Marine Corps directed that the PFT for female Marines be changed, effective January 2014, to replace the flexed-arm hang with pull-ups.

This study is "fact-finding" and seeks to evaluate the PFT policy change for female Marines. It analyzes how well the Marine Corps prepared for and executed this change in terms of expectations and in preparing female Marines for success, as well as in anticipating second- and third-order effects of the new PFT requirement within the eastern recruiting region (ERR). Data-gathering for this phase included a survey of Marines in the ERR and interviews with civilian fitness experts. Additionally, the study compares and contrasts the policy change with federal fitness guidelines, state-run occupational fitness standards, and implementation of the Marine Corps Combat Fitness Test in 2008. The study also evaluates the training program published by Headquarters Marine Corps for females to build their upper-body strength. The study highlights certain consequences of the policy change and recommends further research.

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LIST OF ACRONYMS AND ABBREVIATIONS

ALMAR	All Marines Message
CCP	Combat Conditioning Program
CE	Command Element
CFT	Combat Fitness Test
CNA	Center for Naval Analyses
DEP	Delayed Entry Program
DoD	Department of Defense
DSST	Diversified Soft Tissue Therapy
ERR	Eastern Recruiting Region
EWS	Expeditionary Warfare School
FAH	Flexed-arm Hang
FPFT	Female Physical Fitness Test
GSBPP	Graduate School of Business and Public Policy
HQMC	Headquarters Marine Corps
IRB	Institutional Review Board
JWT	J. Walter Thompson
M&RA	Manpower and Reserve Affairs
MAGTF	Marine Air Ground Task Force
MARADMIN	Marine Administrative Messages
MCO	Marine Corps Order
MCRC	Marine Corps Recruiting Command
MCRDPI	Marine Corps Recruit Depot-Parris Island
METL	Mission Essential Task List
MI	Manpower Information Systems Division
MOS	military occupational specialty
NASM	National Academy of Sports Medicine
NDAA	National Defense Authorization Act
NPS	Naval Postgraduate School
OCCFLD	Occupational Field
OCS	Officer Candidate School
OIC	Officer-in-Charge

OIF	Operation Iraqi Freedom
PCP	Physical Conditioning Program
PCPFS	Presidential Council on Physical Fitness and Sports
PFT	Physical Fitness Test
PT	Physical Training
PU	Pull-up
T&R	Training and Readiness
TECOM	Training and Education Command
YOS	Years of Service

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I. INTRODUCTION

“Every Marine a rifleman” is more than just a common saying in the Marine Corps. It carries significance and meaning from the minute a recruit or candidate steps on the yellow footprints or arrives in Quantico for Officer Candidate School to become a Marine. It also serves to say that Marines undergo the same training process, and through the training process, they become warrior-peers, regardless of their job specialty, rank, or background. Further, it means that all Marines learn how to fight and prepare to engage in basic infantry tactics and procedures.

This mantra creates three baselines: (1) Marines are “equal” on some level; (2) Marines are interchangeable within job specialties to accomplish any mission set before them; and (3) Marines share the same warrior ethos. Marines are taught to believe in this warrior ethos, and support the same training standards to accomplish a mission as a cohesive unit, sustaining one team, one fight. To attain value of individual strengths through career lengths, however, Marine leaders recognize that all Marines are not created equal; it is the shared warrior ethos, the training, and strong unit cohesiveness, along with unwavering determination, that overcome much of these differences in the face of the most destructive enemies. They are a rare breed, proud of what they represent, who they are, and what they can accomplish with what little they might have.

The difference between being treated equally and fairly can be easily confused. Being treated equally means being treated exactly the same. According to the Merriam-Webster online dictionary website, being equal is defined as like or alike in quantity, degree, value, etc.; of the same rank, ability merit (s.v. "Equal," n.d., para. 2). It is known, however, that all Marines are not at the same rank, and that by the mere nature of individuals having different body characteristics, demographics, and cognitive skills, Marines differ physically, mentally, and emotionally, even though they all share the same warrior ethos, the same mantras, and the same ethics. Nevertheless, treating Marines fairly with

respect to their physiological differences and capabilities can create a more equal environment for breeding a successful team but does not mean fairness lowers standards. On the contrary, it means treating each other fairly with dignity and respect, free from bias due to the color of a person's skin, gender, religion, sexual orientation, or other individual differences.

The Marine Corps continuously tracks the diversity of its personnel and works closely with advertising agencies, such as J. Walter Thompson (JWT), on short-term and long-term advertising missions. In doing so, it strives to create a Corps that attracts the best of society, while adhering to the high standards expected of Marines. According to Clifford L. Stanley, the Under Secretary of Defense for Personnel and Readiness, "It is important that we have a military that reflects the society it defends, both in the enlisted ranks and our commissioned officers. This is particularly important, as less than 1 percent of the American public serves in uniform" (Military Personnel Overview, 2011, p. 6). In a continuing effort to achieve diversity, the Marine Corps strives to ensure that its policies and programs are viewed as both sensible and fair, promoting equal opportunities across a wide cross section of the national population.

On November 27, 2012, the Commandant of the Marine Corps released an All Marines (ALMAR) message directing a change to the Physical Fitness Test (PFT) for female Marines only. The message states, effective January 1, 2014, pull-ups replace the flexed arm hang. The message further states that the change will occur in two phases to provide female Marines the opportunity to increase their upper-body strength to succeed in the future, and it publishes a training program through the Marine Corps Training and Education Command (TECOM) website to assist females in gaining upper-body strength to succeed in completing pull-ups (Commandant of the Marine Corps, 2012c).

This ALMAR announcement brought about the most significant change in a physical fitness test since 2008, when the Marine Corps instituted the Combat Fitness Test (CFT) to test all Marines for physical capacity in a broad spectrum of combat-related tasks. The CFT change, however, prompted in-depth testing

within a variety of different commands Marine Corps-wide, and extensive evaluation of times to determine average test scores and scoring tables. All efforts of testing, evaluation, and reevaluation were documented by two follow-up Marine Administrative Messages (MARADMINs) released over the year following the implementation to clarify policies, identify injury trends, and mitigate problems. In contrast, the Marine Corps implemented the pull-up policy change based on relatively limited information. There was no similar effort to gather data from a wide cross section of Marines, no effort to examine injury trends, or any apparent effort to mitigate potential challenges.

This thesis attempts to fill some of these informational gaps by examining societal factors and trends, and by polling the views and experiences of Marines within the eastern recruiting region (ERR) to determine how they are adjusting to the policy change. Further, the study seeks to ascertain if any second- or third-order effects might be mitigated by updates to the policy, providing all Marines with a better environment in which to thrive and be successful.

Numerous studies have been conducted to examine physiological differences between men and women, and, more importantly, the capacity of both in a high-level fitness environment, and why gender is related to different weight standards around the world. This thesis does not argue that men and women have physiological differences, nor does it seek to determine the capacity of men and women in a high-level fitness environment; rather, it seeks to understand the environment in which these differences may manifest themselves, in societal norms, leadership of schoolhouses, government oversight of local firefighter training and testing, senior military leaders' policy changes, and individual Marines' personal views. For this approach, the study reviews a presidential-level fitness program, federal and local firefighting fitness measures, and compares them with Marine Corps fitness measures by gender. In addition, the study sought input from Marines of every rank serving in the ERR to better understand opinions on the fairness of the PFT change for female Marines, and

to determine if input received might provide leadership with ideas for future updates to the policy that would foster positive organizational change.

To understand the training aspect of building upper-body strength to complete pull-ups, two physical trainers in Monterey County were consulted. Both are co-owners and trainers of “Systematic Crossfit” (a Crossfit affiliate), as well as experts and owners of secondary businesses that complement their areas of expertise in sports therapy, movement, and nutrition. Discussions with these trainers provide a more complete picture of the challenges associated with building muscles at different fitness levels and other elements of “fitness” that are comparable to weightlifting or increasing heart rate.

This research strives to look broadly at the overall policy change, how some Marines perceive the new PFT requirement, and whether the change may have certain unintended consequences. The thesis is “fact-finding,” as the PFT policy change for females is ongoing and the deadline for final implementation has been delayed beyond January 2014 until further notice. It is the researcher’s hope that the study will not only inform leaders regarding the present change, but also assist in the process of developing and establishing PFT requirements for the future.

The thesis is organized into six chapters. Chapter II presents background information on the PFT policy change and reviews related literature from a variety of sources. Chapter III describes the methodology employed in the present study, focusing primarily on the survey of Marines in ERR and interviews conducted with fitness trainers. Chapters IV and V discuss the results of the survey and interviews, respectively. The final chapter summarizes the study, presents two concluding themes, and offers recommendations for further study. Appendices are provided to document the survey of Marines and interviews.

II. BACKGROUND AND LITERATURE REVIEW

On April 23, 2012, the commandant of the Marine Corps released an ALMAR message regarding the “Assignment of Women to Ground Combat Units” (Commandant of the Marine Corps, 2012a). This message restates congressional direction in the National Defense Authorization Act (NDAA) and related requirements from the Secretary of Defense to assess the impact of newly opened positions in previously closed units, and to continue evaluating additional positions that may be opened to female Marines across the Marine Corps. In the ALMAR, the commandant calls for research into assignment policies for female Marines, including a total-force survey, to provide him with information and data necessary to make an informed recommendation on potential policy changes. The message further stipulates an exception to the policy for ground assignment of female Marines below the Division Level in a Ground Combat Element, that is, for females already serving in a military occupation open to them (Commandant of the Marine Corps, 2012a).

Seven months later, on November 27, 2012, the commandant of the Marine Corps released another ALMAR directing a change to the PFT for all female Marines. Effective January 1, 2014, pull-ups would replace the flexed arm hang on the PFT for all female Marines. This new policy came as a complete surprise to many female Marines, since there was little, if any, warning order of such a dramatic change. After all, some of the more senior female Marine officers and staff non-commissioned officers were commissioned or enlisted into the Marine Corps prior to dress blue trousers even being issued, and when make-up classes were still mandatory during boot camp and/or Officer Candidate School (OCS).

This policy change would constitute a major shift in physical fitness for women, particularly those who never worried about increasing upper-body strength for pull-ups throughout their career. Over the past 20 years, the Marine

Corps has made significant progress in breaking down barriers of gender-specific training to be more equal. For female Marines, this change also meant modifying a fitness workout schedule that they may have performed successfully throughout their career. Further, many females may not have not worked in a physically-demanding training environment, having been pigeonholed into a combat service support Military Occupational Specialty (MOS), perpetual garrison billet, and/or a desk job commensurate with the assignment policy of female Marines during the time period in which they joined. These Marines would now be required to complete three pull-ups just to stay in the Marine Corps, and even more to be competitive for promotion.

The ALMAR message further states that the new requirement occurs in two phases, providing female Marines with an opportunity to increase their upper-body strength through an upper-body training program published on the Training and Education Command (TECOM) website (USMC female PFT, n.d.). According to the Physical Readiness Programs Officer at TECOM, the training program is a collaborative effort between TECOM Headquarters, Marine Corps Recruit Depot-Parris Island (MCRDPI), Semper Fit, and Marine Corps Recruiting Command (MCRC) (B. McGuire, personal communication, February 2014). The upper-body strength training plan on the TECOM website is recommended to complement the already-directed five combat conditioning training events per week.

Phase One of the new PFT requirement began on January 1, 2013. It was intended as a transition period for female Marines and their leaders to adjust to new training routines and to prepare them for final implementation on January 1, 2014. During Phase One, females were provided the opportunity to choose between the flexed-arm hang or pull-ups on their physical fitness test, and minimums and maximums were set at three and eight (pull-ups), respectively. Phase Two, the actual implementation of the pull-ups requirement, was officially postponed in a message on January 24, 2014, and delayed through June 30

2014. This essentially delayed implementation at least until January 2015, since the PFT is an annual event (Commandant of the Marine Corps, 2014).

A. MARINE CORPS STUDIES AND REVIEWS

A number of studies and other papers have been completed *by* Marines, as well as *for* Marines, addressing issues directly related to the policy change. The present review looks at four of the most relevant and publicly available studies within the past 10 years.

“Shattering the Pull-Up Myth” (Posey, 2005) is a research paper by a student at the Marine Corps Expeditionary Warfare School (EWS). This paper argues that female Marines should be required to perform pull-ups on the PFT for the following reasons.

- Females are physically able to do them (Posey, 2005)
- Physical conditioning should include strength training (as cited in Posey, 2005)
- Physical strength training is a requirement for all Marines (p. 3).
- Upper body development for female Marines is largely ignored (p. 3)

Posey (2005) states, “Women Marines should be required to perform pull-ups on the PFT in order to more accurately evaluate upper body strength, properly condition them for the possibility of combat, and to eliminate differing requirements that can negatively impact unit cohesion” (p. 3). Posey (2005) cites a variety of professionals and scientific studies to support her position. Nevertheless, the paper neglects the extensive training time and effort it takes to build upper-body strength, particularly in females who have not trained to any type of upper-body measurement standard throughout their career.

According to Posey (2005), “since strength can be developed in females just as it can in males, and since the Marine Corps requires strength training for all Marines, there is no reason to advocate different training requirements for male and female Marines” (p. 13). Here, it is apparently assumed that any female, regardless of age, weight, physiology, or other factors, can catch up to

her male counterparts in developing upper-body strength simply by training just like them. Posey (2005) actually supports the seeming contradiction, stating that upper-body development for female Marines has been largely ignored.

In 2009, another student at EWS wrote “The Marine Corps PFT: Not Equal, not Fair” (Easter, 2009). The paper was published to bring attention to perceived unfairness in scoring PFTs by gender, highlighting the fact that only minor differences by gender exist within the physical training for recruits at Parris Island. The author’s point here is that one should therefore expect both genders to have nearly the same PFT scores. However, Easter (2009) never elaborates on the minor differences, particularly if they deal with building upper-body strength, aerobic activity, or even classroom instruction. The author does identify diet differences between males and females, “due to specific gender needs” (p. 10), yet neglects to address physiological differences or how differences in dietary “gender needs” might be linked to physical performance. The most plausible comment the author makes is:

While being fair to the individual is important for morale, the Marine Corps must look out for its own interests first. What events Marines should execute or exactly what the standards should be is a larger issue and beyond the scope of this article. No matter what those events and standards are an underlying problem is how the scoring tables are developed and how they are or are not updated. (pp. 7–8)

Generally, the paper falls short in defining the scope of the issue and, consequently, in recommending practical solutions. A 2011 study by the Naval Health Research Center (hereafter referred to as the “Pull-Up Study”) offers the most comprehensive examination of the implications of replacing the flexed-arm hang with pull-ups or push-ups (McGuire, Vickers, Jr., Reynolds, Curry, Bockelman, & Massimo, 2011). The Commandant tasked TECOM with determining the most effective and feasible upper-body strength test for female Marines, and TECOM collaborated with the Naval Health Research Center to perform the study. This study provided the first indication that the Marine Corps was considering a policy that would replace the flexed-arm hang on the PFT for

women. However, the Pull-Up Study examines the feasibility of employing pull-ups and push-ups as tests of upper-body strength, as an alternative to the flexed-arm hang, and attempts to measure the capacity for females to respond to a training program designed to improve upper-body strength. The study's objectives are summarized as follows:

Concerns have been raised regarding the FAH's [flexed-arm hang's] effectiveness. Most recently, a recommendation from the 2010 Sergeants Major Symposium was to replace the FAH because it is perceived as an ineffective test of upper body strength. Following the symposium, the Training and Education Command (TECOM) was tasked with determining the most effective and feasible upper body strength test for female Marines. (McGuire et al., 2011, p. 3)

The Pull-Up Study included 318 volunteers from various units that belong to TECOM. Volunteers were solicited via email and informed that, if they chose to participate, they would be tested on maximum dead-hang pull-ups, movement pull-ups, self-paced push-ups and cadence push-ups in six weeks. An optional training plan (presumably developed by TECOM) accompanied the email. Upon testing, the participants self-reported the extent to which they adhered to the training program and were categorized as having No Training (n=146), Partial Training (n=38), or Complete Training (n=130). McGuire et al. (2011) report that the mean dead-hang pull-ups for the No Training, Partial Training, and Complete Training groups are 1.47, 1.84, and 1.64, respectively.

With respect to the question of whether and how female Marines' pull-up performance responds to the TECOM training plan, the study concludes that "pull-up training improved performance" (McGuire et al., 2011, p. 2). However, the structure of the experiment does not support such a conclusion. The authors show a statistically significant difference between average number of dead-hang pull-ups in the group that self-declared no training and the average number of dead-hang pull-ups in the group that self-declared consistent training. However, the difference in performance between these two groups is not a measure of effectiveness with which the training plan improves Marines' pull-up performance.

At most, it is a measure of the correlation between Marines' pull-up performance and the training group into which they self-selected. To appropriately capture the effect of the training plan and its contribution to an individual Marine's improvement, the researchers would need to conduct an inventory assessment of pull-up performance of the members of the three groups and then compare their performance at a later point in time.

Essentially, the Pull-Up Study's experimental design does not allow for longitudinal comparisons, which means that it is not possible to determine the presence of selection bias. The participants were invited to be a part of the study and they individually determined whether to (a) participate at all and (b) adhere to the training plan. While IRB protocol requires voluntary participation, the participants could have been randomly assigned to supervised treatment groups. As implemented, consider the participants' possible thought processes when asked to volunteer for this study. Participants who know they are good at pull-ups may be more inclined to volunteer and more willing to try a training program, relative to those who lack upper-body strength, know they are not particularly good at pull-ups, and opt out of participating in the study.

Minor problems are additionally seen with the generalizability of the sample. The average participant is 26 years old, with nearly all participants (97 percent) representing the two youngest age groups as specified in an official PFT. In short, this means that 97 percent of the participants were between the ages of 17–39, providing minimal data to draw conclusions about Marines older than 40 years (McGuire et al., 2011). This also reinforces less generalizability to all female Marines throughout the force. The report further states that study participants were more physically fit than average female Marines, as the average PFT score was slightly higher than the average female Marine PFT score throughout the Marine Corps in 2010 (McGuire et al., 2011). The ages and slightly higher PFT scores are later compared with other studies and deemed as insignificant when generalizing statistics.

In summary, the lack of an inventory assessment, and the fact volunteers were openly solicited without reasonable efforts to randomly assign participants to supervised training groups, severely undercuts the validity of the conclusions concerning the effectiveness of the training program. The methodology also makes it difficult to generalize outcomes to the wider Marine Corps.

In October 2013, the Center for Naval Analyses (CNA) completed a study to analyze pull-up data for females in the Delayed Entry Program (DEP) and at Marines Corps Recruit Depot, Parris Island (MCRDPI) (CNA, 2013). This study was conducted at the request of the Commanding General, MCRC. It examines the effectiveness of the physical training (PT) playbook to bring females to the three pull-up minimum standard. Data on pull-up performance were collected before and after the formalized upper-body strength development program utilized at Parris Island, both prior to the ALMAR being released as well as after (pre-policy change and post-policy change). This study has a better design than that of the Pull-Up study discussed previously.

The study focuses on recruits who arrive at boot camp (Parris Island) unable to complete at least three pull-ups. At the time of the study, females in the DEP (called “poolees”) were not required to complete any pull-ups prior to shipping to boot camp, which creates a significant challenge in boot camp for females to gain enough upper-body strength to complete three pull-ups or risk not graduating. The study examines Marines’ pull-up performance in boot camp before, during, and after PT playbook implementation (CNA, 2013).

The first line in Table 2 of the CNA report (CNA, 2013, p. 3), which summarizes the overall findings, presents this most appropriately (where N = sample size).

Sample	N	Initial boot camp PUs			Final PUs (3 or more)
		0	1	2	
Full PT playbook	502	75%	15%	10%	33%

As seen, “the success of the PT Playbook is most evident here, as 33 percent of these women completed three or more PUs [pull-ups] in their final test” (CNA, 2013, p. 3). Results of this study are staggering, considering that, based on the numbers presented above, 67 percent of females would fail their final PFT at boot camp. On a positive note, the study does indicate that female recruits have the ability to build upper-body strength to complete pull-ups. This study, however, identifies a training problem, relative to the PT playbook that MCRDPI was using, and/or realizing that building upper-body strength for female recruits is not as easy as believed or assumed. A condition not utilized in this study might be to control for female recruits’ weight change from the time they started the PT playbook until the time they finished. If a recruit weighs less at graduation, it may mean that her muscles are better able to pull up that lower amount of weight rather than assuming she gained muscle mass. Tracking body mass as an additional input might provide a better predictor of the effectiveness of the PT playbook.

B. BI-ANNUAL PFT TO SEMI-ANNUAL PFT/CFT

The flexed-arm hang to pull-ups announcement signaled the most significant change in the Marine Corps physical fitness test since 2008 when the Combat Fitness Test (CFT) for all Marines was instituted to test for physical capacity in a broad spectrum of combat-related tasks. The ALMAR announcing the change was published on August 1, 2008. Specifically, the Commandant’s message stated:

Recognizing that Marines are warrior athletes, our fitness program was modified to reflect the same collaboration of effort found at the collegiate and professional sports level. Integration of leadership, combat conditioning instructors, semper fit, diet, nutrition, lifestyle, sports medicine and other medical professionals is (sic) essential to

the establishment of a comprehensive program. (Commandant of the Marine Corps, 2008a)

Essentially, the ALMAR served as the announcement to all Marines of the changes being made and the reasons for those changes, and it provides a clear plan of action for implementing and revising the test. The CFT implementation prompted in-depth testing throughout all communities and ranks of the Marine Corps, directing that Marines would take the test initially for pass/fail. This provides a much larger sample from which to determine average test scores, minimums, and maximums for all Marines. All efforts to test, evaluate, and reevaluate are further documented by three follow-up MARADMINs released over a full year following the announcement to clarify policies, identify injury trends, and establish mitigation strategies. Not only do the messages provide Marines with details of the test, they also offer Marines an opportunity to be trained and led through a process that would become standardized in their future. This is particularly important for senior staff non-commissioned officers and senior officers, to ensure their “buy-in” and proper training to reevaluate and refocus training efforts.

Beginning in January 2010, the implementation phase was expected to be complete; all Marines would complete the PFT from January-June, and the CFT from July-December, with official scoring documented in Marines’ record books. The time from cradle to grave, from the announcement of the change until Marines would be required to do a CFT that affected their career, would be approximately 18 months. Timeline aside, Marines around the globe were part of a testing and evaluation phase to provide senior leaders with a more accurate look at actual performances and injury rates. Equally important was the hands-on leadership and one-on-one training that occurred throughout those 18 months for Marines to be brought to a new standard that would be measured in the future.

C. ORDERS AND MANUALS

Most Marine Corps orders, manuals, and publications address the combat readiness of Marines in some way, circling back to Marines being physically fit, as the core of a Marine's warrior spirit. As such, the Marine Corps even has had an order directing physical fitness of all Marines dating back to 1956 (MCO 6100.0, 1956). The present study, however, focuses only on relatively recent orders, manuals, and publications dealing specifically with physical fitness or combat fitness as it relates to combat readiness.

The review begins with a Marine Corps Order (MCO) dated May 10, 2002, with a change published via MARADMIN on March 26, 2003, which coincides with the publication of the Defense Instruction mentioned above. The 2002 Marine Corps Order (updated in 2003 with Change 1) provides a broadly defined scope of Physical Fitness, stating that "every Marine must be physically fit, regardless of age, grade, or duty assignment" (Commandant of the Marine Corps, 2002). The order directs every Marine to engage in an effective physical conditioning program (PCP) on a continuing and progressive basis, putting responsibility on leaders to prescribe, execute, and monitor an effective PCP. In this order, Marines are expected to physically train at least three times per week, but recommended five times per week. The overall program focuses on combat conditioning, health, fitness, and unit cohesion rather than on preparation exclusively for the semi-annual PFT. Specific to the components of physical conditioning, the Order states that the areas of Strength, Endurance, and Mobility categorically should be included in both individual and unit PCPs and testing in the form of a PFT twice per year (once during January-June and once during July–December). According to this Order, the PFT provides an instrument that measures the collective level of physical fitness Marine Corps-wide. It is a measurement of general fitness, not combat readiness or unit/MOS capability, and it consists of three events, differentiated by gender: male Marines perform dead-hang pull-ups, abdominal crunches, and a 3-mile run; female Marines perform the flexed-arm hang, abdominal crunches, and a 3-mile run. The only

gender difference is the test to measure upper-body strength and stamina (Commandant of the Marine Corps, 2002).

A 2008 Marine Corps Order, updated in 2009 with Change 1 (Commandant of the Marine Corps, 2008b), replaced the 2003 order and begins by defining the fitness of Marines differently than does its predecessor. The 2009 version states: "As professional warrior-athletes, every Marine must be physically fit, regardless of age, grade, or duty assignment" (Commandant of the Marine Corps, 2008b). It covers combat conditioning, as opposed to physical conditioning, and does so by including a further measurement tool called the CFT. The implementation of the CFT takes the place of one PFT during the year, in July-December. In perspective, Marines are now required to run a PFT during the months of January-June and a CFT during July-December.

This order still puts the responsibility of physical and combat conditioning on commanders/officers-in-charge (OICs) in addition to the detailed development, implementation, and management of their organizational combat conditioning program (CCP, now renamed from PCP as mentioned in the 2003 MCO). This significant change could very well be attributable to Operation Iraqi Freedom (OIF) and the lessons learned by commanders on the battlefield having a new understanding of the current battlefield's challenges. Daily and weekly training in this order has changed, as well, consisting of five 30-minute sessions per week and strength training done at least twice per week, in combination with or separate from cardiorespiratory exercise. This CCP training regimen addresses the specific unit's mission essential task list (METL), as stated in the June 2004 publication on Marine Physical Readiness Training for Combat, which follows.

The June 2004 version of the "Marine Physical Readiness Training for Combat Manual" (MCRP 3-02, 2004) starts boldly by stating:

Physical fitness training in the Marine Corps has one purpose: to prepare Marines to physically withstand the rigors of combat. All other goals of physical fitness training are subordinate to and must

support attainment of this goal. The idea that only infantry or reconnaissance units and their attachments normally face physically demanding combat is wrong. This error must not influence the priority commanders of combat support, combat service support, aviation, and headquarters units give to physical fitness for combat. Physical fitness for combat has a high priority for all Marines. A sound, effective unit program, requiring limited time and material, offers a greater payoff in combat than many more expensive and time-consuming training programs. (p. 1-1)

A few pages later, the manual divides the physical demands of combat into three primary elements: lower-body strength and stamina, upper-body strength and stamina, and a competitive, combative spirit (MCRP 3-02, 2004, p. 1-3). When targeting upper-body strength and stamina, the manual states that some common demands placed on the upper body by combat are as follows: rapidly emplacing crew-served weapons; handling large-caliber ammunition for extended periods; climbing walls, cliffs, and other high obstacles; and performing field maintenance on aircraft or heavy machinery (MCRP 3-02, 2004).

Another Marine Corps manual, titled “Marine Air Ground Task Force (MAGTF) Command Element (CE) Training and Readiness (T&R) Manual” (NAVMC 3500.116, 2012), published in July 2012, emphasizes the importance of individual and unit readiness and identifies the minimum standards that Marines must be able to perform in combat. This manual, however, speaks directly to military MOSs rather than basically qualified training of a Marine’s physical and combat fitness levels. The correlation can be made regarding the relevance of training in occupational fields, as mentioned in the DOD instruction of this paper (next section), as well as training occurring in less than ideal situations, leaving commanders the opportunity to utilize judgment in determining when their unit’s training has been effective and when they are considered combat ready. As stated in the manual:

Individual training and the mastery of individual core skills serve as the building blocks for unit combat readiness. A Marine’s ability to perform critical skills required in combat is essential. However, it is not necessary to have all individuals within a unit fully trained in order for that organization to accomplish its assigned tasks.

Manpower shortfalls, temporary assignments, leave, or other factors outside the commander's control, often affect the ability to conduct individual training. During these periods, unit readiness is enhanced if emphasis is placed on the individual training of Marines on-hand. Subsequently, these Marines will be mission ready and capable of executing as part of a team when the full complement of personnel is available. (NAVMC 3500.116, 2012, Encl1, p. 1-2)

This manual states that leaders at all levels must evaluate the performance of their Marines and the unit as they complete training events, and only record successful accomplishment of training based upon the evaluation. Ultimately, as mentioned above, leaders remain responsible for determining if the training is effective (NAVMC 3500.116, 2012). This level of trust and assurance is afforded to Commanders in determining their Marines' competencies and readiness to go to war, yet this same trust and assurance is not available to them when determining the physical fitness of their Marines.

D. DEPARTMENT OF DEFENSE (DOD)

On November 5, 2002, the Assistant Secretary of Defense signed a DOD Instruction directing all Military Services to design physical fitness training and related activities that enhance fitness and general health/injury prevention to promote combat readiness and support DOD's mission (DODI 1308.3, 2002). The order further explained that the Services have the latitude to tailor and design their fitness programs to suit their Services' particular needs and missions, but must be consistent with established scientific principles of physical conditioning.

This order also states that military services shall extend their physical fitness programs to incorporate occupational-specific physical fitness requirements for those career fields where it is deemed necessary to ensure adequate skill, performance, and safety, including identification of each specific physical capability needed by the occupational specialty (DODI 1308.3, 2002, p. 5) These additional standards by occupational field will include a risk assessment to prevent injuries and will reflect levels of physical abilities necessary to meet

the duty demands of the occupation. Once levels of physical capabilities are identified, personal fitness training and testing should be linked to these capabilities. As new and improved training methodologies emerge, the instruction provides further latitude for the services to consider them when updating their fitness training (p. 5)

Evaluation of these programs is directed by using PFTs at least once annually by service. PFTs will evaluate aerobic capacity, muscular strength, and muscular endurance. According to the instruction, aerobic capacity, muscular strength, and muscular endurance are defined as follows:

- a. Aerobic Capacity. The functional capacity of the heart, lungs, and blood vessels to deliver oxygen to the working muscles, and its utilization by the muscles to oxidize energy sources (carbohydrates and fats) to generate energy over sustained periods of time. Essentially, it is the body's capability to receive and use oxygen, carbohydrates, and fats to produce energy.
- b. Muscular Strength. The maximal force that can be executed in a single voluntary contraction of a skeletal muscle or skeletal muscle group. The simplest measure of strength involves various one-repetition maximum weight-lifting tests (the heaviest weight that can be lifted only once). Although tests such as push-ups, pull-ups, and sit-ups measure primarily muscular endurance, there is a physiological continuum where individuals who can perform only a few repetitions of a test are completing a strength test. Thus, the pull-up, for which many individuals can complete only a few repetitions, is closer to a true strength test than the push-up.
- c. Muscular Endurance. The ability of a skeletal muscle or group of muscles to perform repeated contractions for an extended period of time. It is measured as the number of submaximal contractions performed or submaximal sustained contraction time. Most of the practical "strength" tests (e.g. push-ups and sit-ups) are measures of muscular endurance (DODI 1308.3, 2002, Encl 1, p. 10).

PFTs will be designed to test individual service-wide baseline or generalized fitness levels. It is noted that the PFT is not intended to represent mission or occupationally-specific fitness demands (DODI 1308.3, 2002, p. 6).

E. CONGRESS

In a February 2012 report to Congress, titled “Review of Laws, Policies and Regulations Restricting the Service of Female Members in the U.S. Armed Forces,” DOD assessed the impact of gender-restricted policies on the equitable opportunity for women to compete and excel in the Armed Forces. This report states, “the Department of Defense is committed to removing all barriers that would prevent service members from rising to the highest level of responsibility that their talents and capabilities warrant” (Report to Congress, 2012, p. i). The commission that wrote this report documented serious practical barriers that would require time to resolve so that the department could maximize the safety and privacy of all military members while maintaining the military readiness of individual services.

In doing so, the report reviews and recommends amendments to five elements of the policy that formally restrict service by women. Several elements relate specifically to Marines and the Marine Corps; two, in particular, resonate with training Marines equally:

a. **Direct Ground Combat:** DOD policy currently prohibits women from assignment to units below the brigade level whose primary mission is to engage in direct combat on the ground. At the time this policy was put into place more than 20 years ago, it served to keep women from engaging in direct combat. Due to modern day warfare and redefining lines within a battle space however, the report included notification to Congress that the Secretary of Defense already approved an exception allowing the U.S. Army, U.S. Navy and U.S. Marine Corps to open positions at the battalion level of direct combat units, in select occupational specialties currently open to women.

b. **Physically Demanding Tasks:** The Secretary of the Military Department concerned may restrict positions, which include physically demanding tasks that would exclude the vast majority of women. The report states that eliminating this assignment exclusion requires the development of gender-neutral physical standards for the many physically demanding job related tasks. It also recognizes that the establishment of scientifically supportable

physical standards will likely mitigate the number of injuries incurred during a career, for both men and women, and expand the number of occupational specialties open to women. The report pays tribute to the Marine Corps for already initiating efforts in this area and cites that the Department is furthering its' efforts of other Services through funded research. (Report to Congress, 2012, pp. i-ii)

F. PRESIDENTIAL-LEVEL FITNESS

In 1956, the “President’s Council on Fitness, Sports, and Nutrition” was created by President Dwight D. Eisenhower, following the publication of two disturbing articles, one in the *Journal of the American Association for Health, Fitness, Physical Education, and Recreation* (1953) and another in the *New York State Journal of Medicine* (1955). Both articles discussed the relatively poor state of youth fitness in America as compared with that in Europe. The council sought to raise awareness among American youth, and Americans more generally, that they should lead more healthful, active lives. Among the 11 formal recommendations from the first council conference are the following: “Better Leadership is needed for physical activity at home, in the school, and in the community”; “Adults should be role models for physical fitness”; and “Girls should have equal opportunities for physical fitness” (Sturgeon & Meer, 2006, p. 43). The first council developed a battery of tests for students nationwide as a pilot-study of fitness levels for boys and girls, ages 5 to 12 years old. The items included to measure upper-body strength were pull-ups for boys and modified pull-ups for girls, straight leg sit-ups, shuttle run, standing broad (long) jump, 50-yard dash, softball throw for distance, 600-yard run/walk, and three aquatic tests that were rarely used (Plowman, Sterling, Corbin, Meredith, Welk, & Morrow, Jr., 2006). This is the first documented physical fitness test for students under the continuing program, and it should be noted that the test recognizes differences between boys and girls in measuring their upper-body strength.

Each president thereafter has modified the Fitness Council and program. For example, using Executive Order 11074, President John F. Kennedy officially expanded the council’s mission to include Americans of all ages and renamed

the organization the President's Council on Physical Fitness (Sturgeon & Meer, 2006). In 1968, President Lyndon B. Johnson expanded the council's mandate to include sports, renaming it as the Presidential Council on Physical Fitness and Sports (PCPFS).

In 1986, the PCPFS distributed its new fitness test and awards flyer. Selected test items once again measured the upper body strength of boys and girls differently, including pull-ups for boys and flexed-arm hang for girls, sit-ups, 1-mile run, shuttle run, and sit-and-reach. Throughout the following months, however, disagreements on testing and overall program design prohibited full program development. It was not until 1992 that the PCPFS implemented a 90-degree push-up, modified pull-up, and trunk lift for both genders on their test in measuring upper-body strength.

The Presidential Youth Fitness Program, as it is known today, measures upper- body strength in boys and girls without discrimination of event, using the 90-degree push-up, a modified pull-up and/or the flexed-arm hang, regardless of gender, but based on ability to complete the event.

G. FIREFIGHTERS

The Bureau of Land Management (BLM) website states that they recognize "excellent physical fitness is essential to firefighter performance" (e.g., "BLM," n.d., para. 1). BLM falls under the U.S. Department of Interior; within BLM is the Fire and Aviation Directorate. BLM is an organization that provides national direction, leadership, policy standards, and operational oversight to state and field offices to ensure safe, cost-effective, and efficient fire and aviation management programs (e.g., para. 1). Much like the Presidential-Level Fitness Challenge, BLM offers the "National Fire Operations Fitness Challenge" to encourage physical fitness among all firefighters nationwide. This challenge is not gender-specific, nor does it provide different methods to scale performance by gender or to alter test scores based on gender or age. Although this challenge

is voluntary, it offers firefighters an opportunity to measure their fitness levels with those of other firefighters annually. As described by BLM:

The Fire and Aviation Directorate (FAD) is a diverse, professional organization dedicated to providing national direction, leadership, policy, standards, and operational oversight. FAD works with state and field offices to ensure a safe, cost effective and efficient fire and aviation management program in support of the national Bureau of Land Management (BLM) mission (e.g., para. 1)

The challenge itself measures aerobic fitness, muscular strength, and muscular endurance, similar to the PFT for the Marine Corps. The events are a 1.5-mile run or a 3-mile run, pull-ups, push-ups, and sit-ups. Again, events and scoring are not scaled by age or gender. Overall scores are calculated using a point system, and each category has a minimum score to pass the overall test. It is important to keep in mind, however, that this is voluntary program and not a national standard for firefighters.

The present review of physical readiness standards used by county and township fire departments led the researcher to a lifetime member of the Fire Company from Keyport, New Jersey, Kenneth Marr. Marr confirmed that both male and female firefighters have to pass the same physical and aptitude exams at the Fire Academy located in Freehold, New Jersey. He further stated that physical fitness testing for local firefighters does not exist after graduation, but that firefighters are expected to "stay in shape." Similar policies are applied in Houston, Texas, according to Troy Steinberg, a Houston Firefighter for more than 23 years. According to Steinberg, men and women are subject to the same physical and aptitude standards, which are likewise tested in their local fire academy. Further, Steinberg confirmed that no annual retesting occurs, although he felt that it might be beneficial in the future to have such retesting.

H. COMMON THREADS AND TRENDS

The present review of literature suggests that society's norms have slowly evolved away from traditional, gender-specific requirements and expectations, as

seen in the Presidential Youth Fitness programs abolishing fitness standards by “boy” versus “girl” events, toward developing gender-free standards based on validated outcomes or job requirements, as witnessed among firefighters. Additionally, actions in Congress and DOD continue to establish standards that emphasize both inclusiveness and fairness, regardless of gender, across the Military Services. These indicators suggest an increasing awareness of the costs and benefits of gender-neutral physical standards as well as the need to base them on realistic, empirically validated occupational or task requirements.

A common theme among Marines is the importance of leadership and its ability to overcome any obstacle to accomplish the mission. The belief in the Marine Corps is that wise leadership, a strong-willed approach, and a positive attitude can create a fertile breeding ground for success throughout the ranks. However, successful leaders also understand that a “do it now” mindset can have unintended consequences; that is, individuals have normal, yet different, “learning curves,” and full preparedness is consequently a product of adequate time and training.

All of the Marine-related papers and studies reviewed here recognize that a significant training gap has existed between male and female Marines for many years. Indeed, these gender differences have existed for so long that any attempt to bridge the gap needs to be carefully planned and executed. On the surface, changing the PFT requirement for female Marines from a flexed-arm hang to pull-ups seems reasonable and desirable for all the right reasons. Previous research seems to indicate that female Marines can, if given the right resources, gain the upper-body strength necessary to pass the new PFT requirement. However, what are the possible consequences of the new policy outside of its immediate goals? For example, given the longstanding training gap between men and women in the Marine Corps—and throughout the American population as a whole—would this new policy affect the recruiting, retention, or careers of female Marines? Are Marines comfortable with the pace and preparation for the policy

change? These are important questions, and the present study seeks to provide some answers.

The next chapter describes the methodology used to conduct the study, which included an online survey of Marines within the ERR and interviews with selected fitness trainers. Additionally, the chapter examines the demographic characteristics of the survey respondents and how they compare with that of the entire Marine Corps and target population.

III. METHODOLOGY

This chapter describes the methodology used to analyze Marines' attitudes toward the PFT policy change for female Marines from the flexed-arm hang to pull-ups. The narrow scope of the present study is due primarily to time constraints and the academic calendar at the Naval Postgraduate School (NPS). Nevertheless, the survey data provide a firsthand look into how Marines assigned to the ERR are adjusting to the PFT policy change and whether the existing training regimen can help female Marines develop their upper-body strength to successfully pass the pull-ups requirement.

A structured, online survey was administered to Recruiters, Drill Instructors, and Permanent Personnel within the ERR. At the time of the survey, this included 3,986 Marines, with 3,600 male Marines and 386 female Marines. Due to limitations of the survey software and time constraints, controls could not be used to prevent the survey from being taken by other Marines outside of ERR. Further, the existing software did not prevent Marines from taking this survey more than once, although it is highly unlikely that anyone would have the time or inclination to do so. At the same time, due to this policy change affecting Marines regardless of gender, gaining additional perspectives of some Marines outside of ERR was welcomed. However, data auditing and anecdotal evidence suggest that the number of respondents outside of ERR is minimal.

A. SURVEY

1. Design

The survey combines dichotomous questions, rank-order scaling, demographic questions, and one open-ended question at the end to solicit comments from respondents. Since this survey was believed to be the first sent exclusively to ERR to address the PFT policy change, it was designed primarily as an exploratory effort in the hope of gaining some sense of how the new requirement could affect recruiting and retention. Additionally, the survey was

designed to gauge the experiences of female Marines in preparing for the policy change as well as their views regarding physical training programs to improve upper-body strength.

All survey protocols, tools, and questions were approved by the NPS IRB to ensure that participants' rights and personally identifiable information were protected, to include approval from CG, ERR to administer the survey to her Marines. A follow-on Marine Corps IRB "Administrative Review" was later completed by the commanding general, Marine Corps Combat, Development Command (MCCDC). The survey was administered from Friday, January 24, 2014, to Friday, February 14, 2014, using the web-based tool, "LimeSurvey." "LimeSurvey" is the only online survey platform approved for use at NPS. The survey was forwarded in two groups (to drill instructors and permanent personnel at Parris Island and to Recruiters) because of the unique structure of ERR. Two ERR civilians emailed the survey link to Marines, ensuring undue influence was not a factor. Both groups had access to the same survey link, and no tracking was used to identify the groups.

The survey was distributed by email to Marines, both active and reserve, within ERR. The survey included a total of 32 questions and is presented in Appendix A. The survey questions are divided into five groups: "Consent," "Policy," "Training," "Demographics," and "Comments." In keeping with NPS Institutional Review Board (IRB) requirements, "Consent" was the only mandatory group, consisting of one question. "Policy" was composed of 14-scaled questions. "Training" included eight dichotomous, multiple-choice or scaled questions. Eight demographic questions covered personal and career characteristics, including whether the participant ever served as a recruiter or drill instructor. Finally, one open-ended question gave survey respondents an opportunity to elaborate on survey questions or add other comments on the topic.

2. Administration

The initial plan was to have the survey stay active for two weeks only, intending for both groups to receive the link on the same day. Instead, the groups received their links to the survey one week apart; consequently, the NPS IRB granted a 1-week extension to keep the survey active. The survey was temporarily blocked while awaiting approval for the extension only when the date/time extended beyond the originally approved protocol. No controls were used to restrict Marines from Group #1 to still take the survey during the one-week extension, nor were controls used to restrict other Marines from taking the survey. As mentioned previously, it was felt that a broader sampling of Marines could be advantageous, in the event that a few Marines outside of ERR may have opted to participate.

An email invitation to participate (presented in Appendix B) was distributed on January 24, 2014, to Group A, and on January 31, 2014, to Group B. Group A received their first survey reminder (presented in Appendix C) on February 4th, 2014, while Group B received the same survey reminder (also presented in Appendix D) on February 7, 2014. The final reminder was sent to Group A on February 7, 2014. As noted above, the survey was temporarily shut down from midnight February 7, 2014 through noon on February 10, 2014, awaiting NPS IRB approval for an extension. Once approved, the survey was reactivated, and the final reminder was intended to go out on February 14, 2014. Inclement weather affected non-mission-essential personnel from working part of the workweek of February 14, 2014; therefore, participants of Group B never received their final survey reminder. The survey was closed at midnight on February 14, 2014. By the conclusion of the survey, a total of 457 responses were received. This represents a response rate of 11.5 percent, from a target population of 3,896 Marines. Of the 457 surveys returned, 372 (81.4 percent) were fully completed.

3. Open-ended Comments

The final question on the survey reads as follows: "Please feel free to share any comments below." (Appendix A, Question 32). A total of 180 respondents (48 percent) took the time to write a comment. Some of the comments were relatively long and quite descriptive, offering an added perspective on Marines' views regarding the PFT policy change. As it turned out, these comments provided invaluable insight to researchers, and they are used throughout the thesis to address the challenges and experiences reported by Marines. Some comments even recommended policy changes for the future.

B. INTERVIEWS

1. Design/Organization/Content

In an effort to gain independent, expert knowledge of physical fitness and training, two professionally-certified physical fitness trainers were interviewed as part of the study. Questions were designed to inquire about potential or perceived differences between training men and women, particularly when trying to increase upper-body strength. The two interviewees were asked about their approach to training as well as their professional opinion of the Marine Corps training program posted on the TECOM webpage. They were also asked to offer any general recommendations, if they felt comfortable doing so, on changes or modifications that might provide a better tool for training women to complete pull-ups.

The interviews were conducted in Pacific Grove, California in February 2014 (see specific details below). The first interviewee was Robert Fontecchio, owner/coach of Systematic Strength, a Crossfit Affiliate Gym located at Pacific Grove, CA. Fontecchio is a CrossFit Level 1 certified instructor, CrossFit Olympic Weightlifting Certified instructor, orthopedic massage therapist, CMT, Titleist Performance Institute certified fitness instructor, and a Functional Movement Systems certified professional. Fontecchio also owns a private sports therapy practice located in Pacific Grove, CA. Mike Healy was the second

interviewee. Healy is a program design and nutrition coach, as well as CrossFit Level 1 certified instructor, CrossFit Endurance certified, CrossFit Mobility certified, CrossFit Nutrition certified, USAW Sports Performance Coach Level 1, and certified by the National Academy of Sports Medicine (NASM CPT) to coach fitness.

2. Administration

Prior to interviews, all survey questions were approved by the NPS IRB to ensure participants' rights and their protection as human subjects. Participants provided written consent by signing a Standard IRB Informed Consent Form prior to the interviews and reviewing any material. (Appendix E) A request to interview recruitment email was sent to both Fontecchio and Healy on February 4, 2014 (Appendix F). On February 10, 2014, an interview date of February 12, 2014, at 1 pm was confirmed with Fontecchio. The interview lasted approximately 75 minutes due to follow-up questions and additional information that Fontecchio wished to provide. A list of the questions is presented as Appendix G.

Healy responded immediately, agreeing to the interview. On February 25, he provided input via email first to maximize our discussion time at the interview scheduled for February 28, 2014, at 9 am. The list of questions for Healy is presented as Appendix H.

C. DEMOGRAPHICS

1. Representativeness of Survey Respondents: Comparison of Respondents with Target Population and Total Marine Corps Population

As noted previously, at the time of the survey, 3,986 ERR Marines were considered available to participate in the survey. A request to participate in the survey was sent to the entire ERR population, including Marine officers and enlisted personnel, male and female. A total of 457 responses were received, which represents a gross response rate of 11.5 percent. Out of the 457 surveys returned, 372 (or 81.4 percent) were fully completed. Eight demographic

questions were included in the survey to assess the diversity and representativeness of the Marine respondents. This information was also used to identify possible trends by gender or MOS and to generally provide additional data for analysis.

a. Gender

Figure 1 compares the gender distribution of survey respondents with that of the ERR target population and the total Marine Corps. The total population of the Marine Corps is included in the analysis to provide a baseline for interpreting the results and possibly generalizing beyond the sample of respondents. Data on the ERR population were obtained from Marine Corps Recruiting Command (MCRC). Data on the total Marine Corps population were provided by Manpower Information Systems Division (MI), Manpower and Reserve Affairs (M&RA), Headquarters, Marine Corps (HQMC) (HQMC, 2014). The total Marine Corps data include only Marines with the same component codes as listed in ERR data. This ensures that USMC population data match the same criteria. Component codes 11 (Active Duty), B1 (AR program), CD (EAD Recruiter), and CE (Reserve Recruiter Aide) were used in the Marine Corps data pull.

As seen in Figure 1, the proportion of female Marines among respondents (20.4 percent) is about twice as large as the proportion of women in the ERR target population (9.7 percent) and even larger than the proportion among Marines as a whole (7.4 percent). It should be noted, however, that the reported proportion of female respondents is affected by the number of respondents who declined to answer the question or submitted a partially-completed survey (a total of slightly more than 20 percent). When the number of Marines who declined to answer the question or submitted a partially completed survey is eliminated from the population of survey respondents, the proportion of female Marines among respondents rises to roughly 25 percent and the proportion of male Marines similarly rises from 59.5 percent to around 75 percent.

Clearly, females are considerably overrepresented among survey respondents. Given the nature of the topic and direct impact of the policy change for female Marines, it is reasonable to assume that females believed they had more to gain from completing the survey than did their male counterparts, and therefore took time from their day to complete the survey. The relatively high percentage of respondents who “declined to answer” or did not complete the survey might be attributed to either Marines reviewing the survey and not actually taking it, Marines saving the survey but not finishing, or Marines wishing to be completely anonymous, quite possibly due to some fear of reprisal.

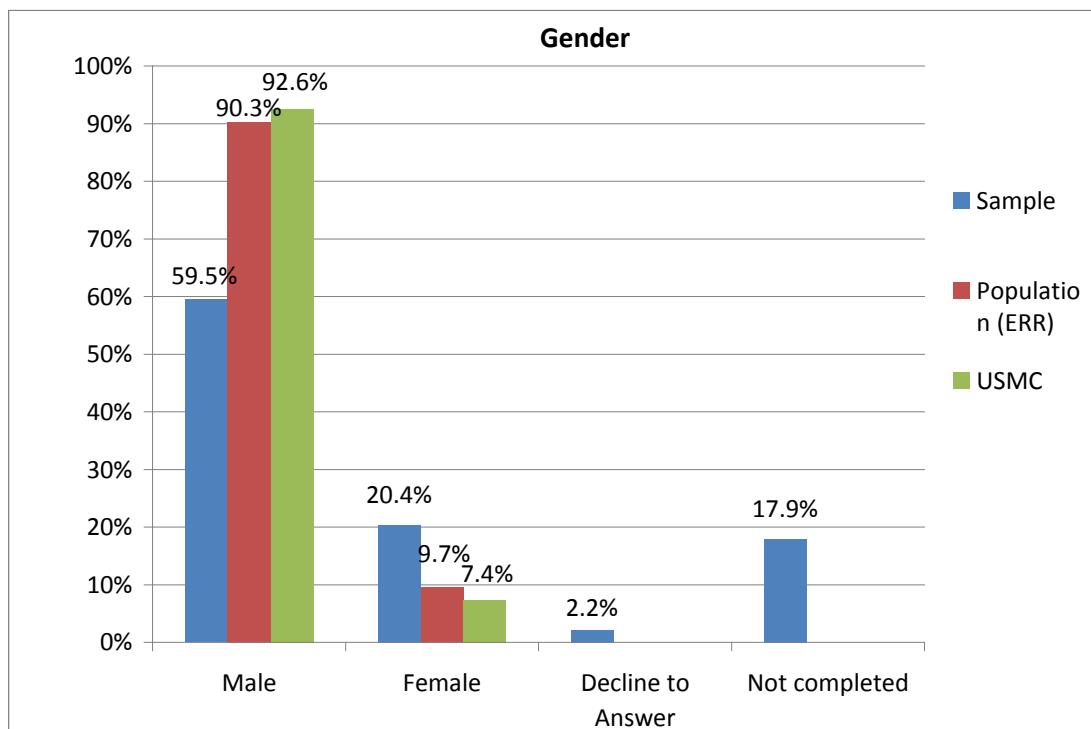


Figure 1. Gender Representativeness of Survey Respondents: Comparison of Survey Respondents with Target Population and Total Marine Corps (after LimeSurvey, MCRC, M&RA, 2014)

b. Length of Service

Figure 2 compares the length of service of survey respondents with that of the ERR target population. As seen here, the survey respondents closely

resemble the ERR population, and more so than shown in the figure when persons with incomplete surveys and unanswered questions are removed from the calculation. The only notable differences can be seen in the categories of “9–12 years” served and “13–15 years” served.

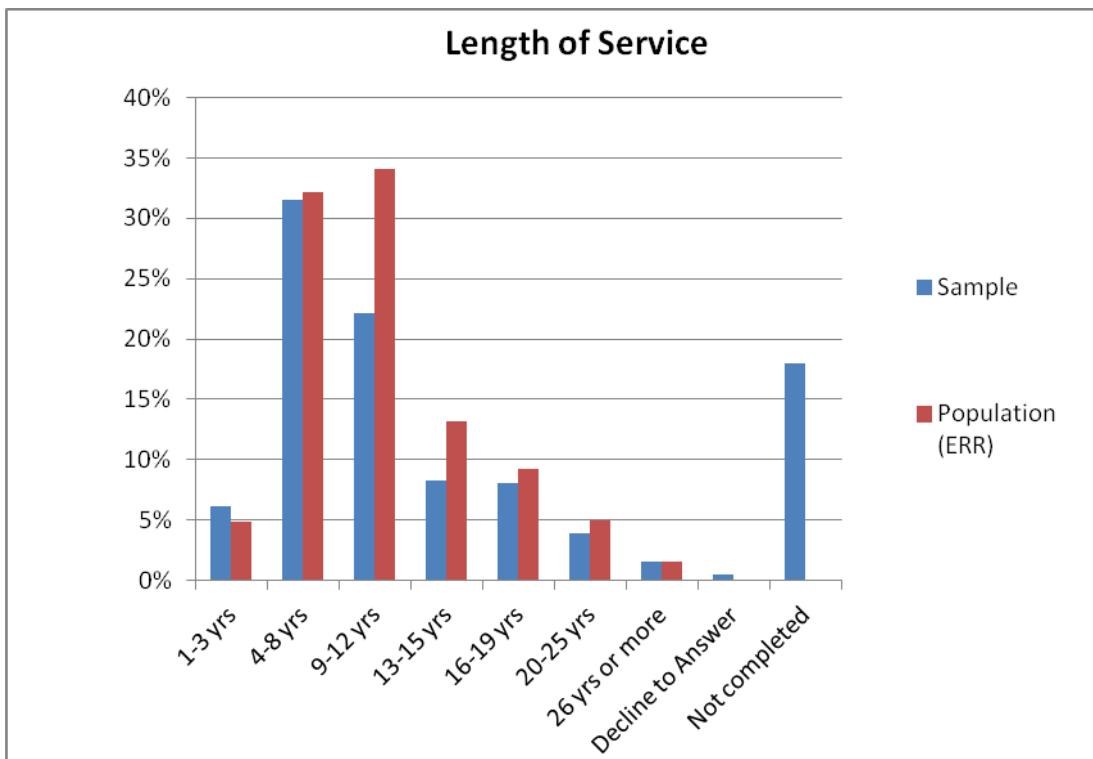


Figure 2. Length of Service Representativeness of Survey Respondents: Comparison of Survey Respondents with Target Population (after LimeSurvey & MCRC, 2014)

c. Grade

As seen in Figure 3, roughly 28 percent of survey respondents are in pay grade E5, compared with over 40 percent of Marines in the ERR target population. When respondents with incomplete surveys or unanswered questions are eliminated from the base population of respondents, the difference between these two proportions rises to approximately 15 percentage points. It is interesting to observe in Figure 3 that Marine officers are overrepresented among survey respondents in each officer pay grade, from 01 through 06.

Researchers believe the slight over-representation of all officers' response rates compared with that of enlisted response rates might just be a respectful courtesy to a fellow officer requesting input for a student-led research project, or quite possibly a venue for officers to voice their opinion in a manner they believe leadership should hear, without fear of reprisal.

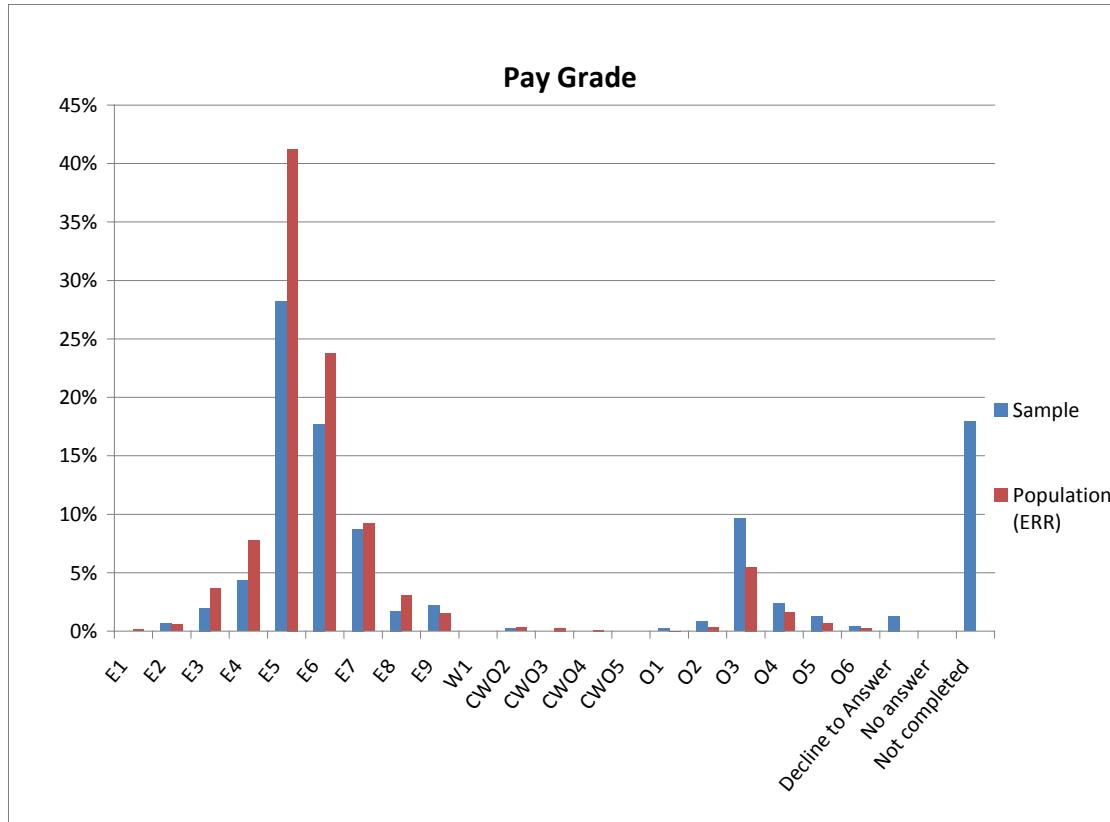


Figure 3. Grade Representativeness of Survey Respondents: Comparison of Survey Respondents with Target Population (after LimeSurvey & MCRC, 2014)

d. Status

Figure 4 shows the distribution of survey respondents and ERR target population by active and reserve status. As expected, the majority of the respondents are active duty, with less than one percent of reserves completing the survey from a population size of about 4 percent.

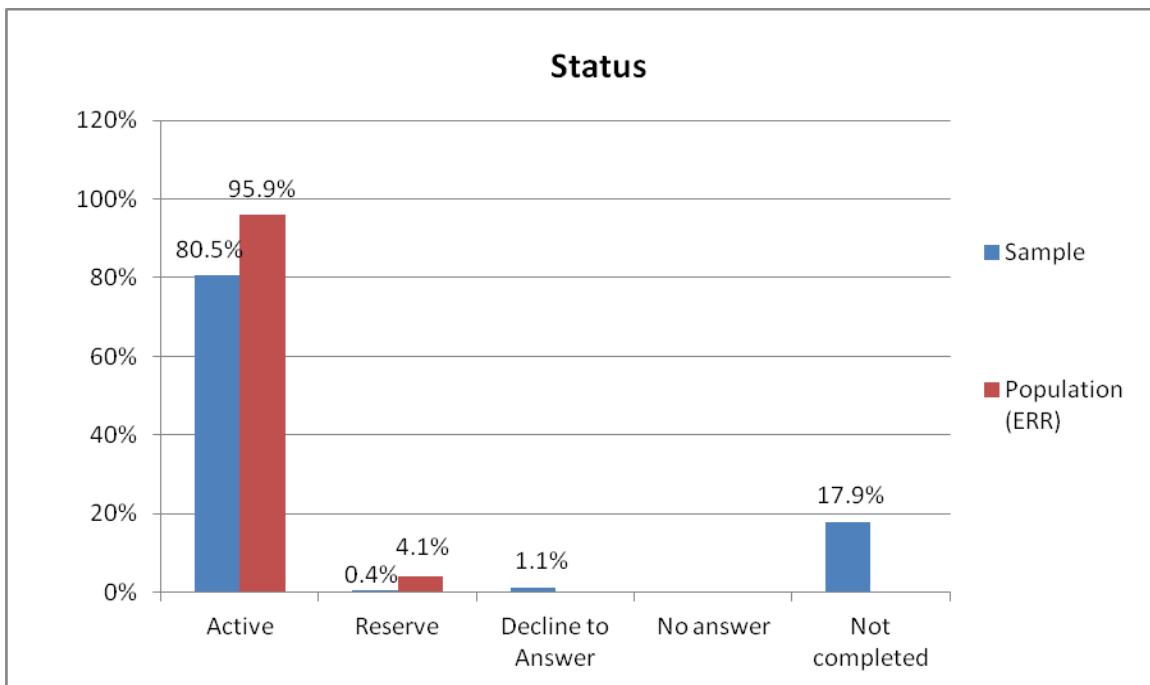


Figure 4. Status Representativeness of Survey Respondents: Comparison of Survey Respondents with Target Population (after LimeSurvey & MCRC, 2014)

e. *Military Occupational Specialty (MOS)*

Figures 5 and 6 show the distribution of survey respondents and ERR target population by MOS. The MOS distribution was analyzed to identify trends and possible differences by specific occupational area. Two figures are presented here, dividing MOSSs merely to facilitate readability (NAVMC 1008A, April 2010). As seen here, most MOSSs are represented among the survey respondents, with just a few exceptions. At the same time, survey respondents are somewhat underrepresented in MOSSs 03XX, 35XX, and 8XXX.

Of note, the 03XX MOS is still a restricted MOS, allowing only males to fill all 03XX jobs, and therefore may infer less interest in taking the survey. The researcher did not identify any possible trends associated with the underrepresentation of the 35XX MOS. However, the 8XXX MOS is comprised of all colonels, sergeants major, first sergeants, and career recruiters. Marines

achieving the 8XXX MOS are senior leaders in the Region, along with duty experts in recruiting. Their leadership and job expertise shoulder the most responsibility in leading and accomplishing the recruiting mission, and therefore may have less time to take a survey.

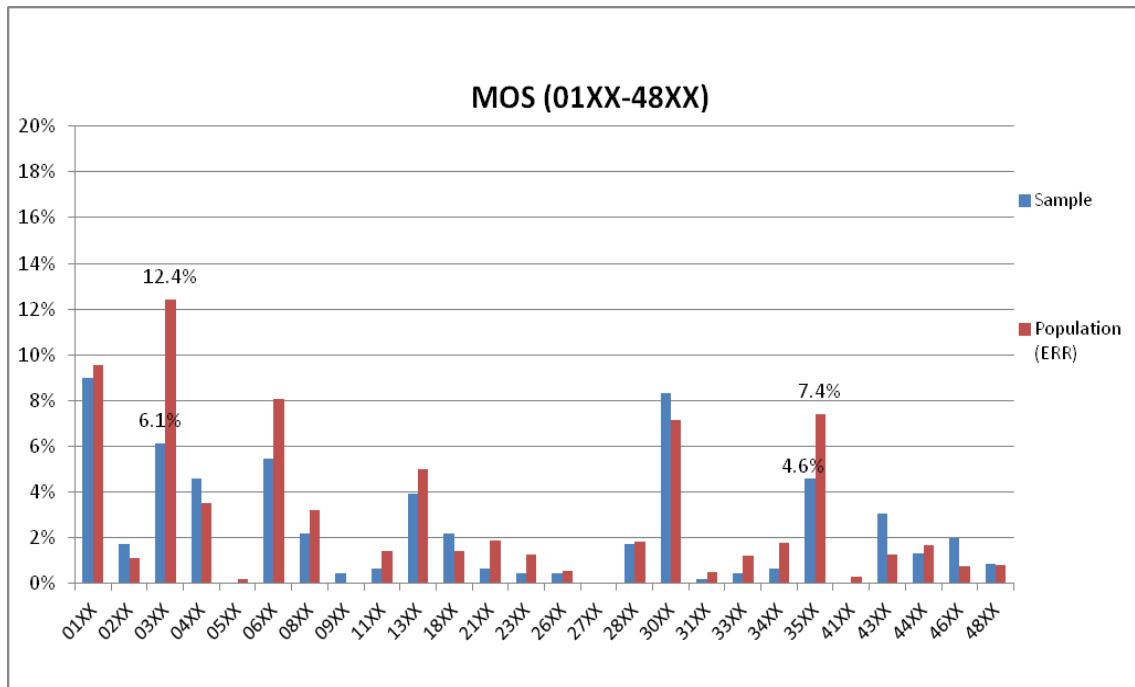


Figure 5. MOS Representativeness of Survey Respondents:
Comparison of Survey Respondents with Target Population
(after LimeSurvey & MCRC, 2014)

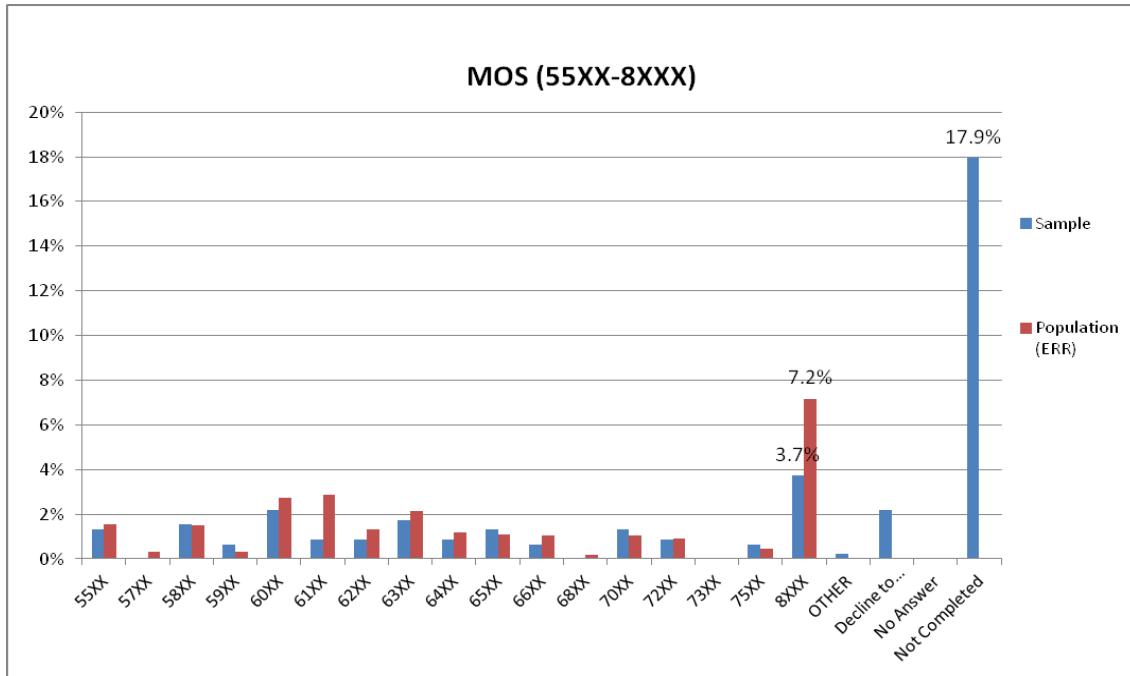


Figure 6. MOS Comparison of Sample vs. Population for MOS (55XX-8XXX) (after LimeSurvey & MCRC, 2014)

f. Combat Deployments

Figure 7 shows the percentage distribution of survey respondents by the number of combat deployments they had experienced at the time of survey administration. These data were not readily accessible in the ERR population data. This question was included in the survey to determine if differences existed, by number of combat deployments, regarding the amount of upper-body strength required for a combat deployment. As seen here, almost 80 percent of survey respondents who answered the question had at least one combat deployment.

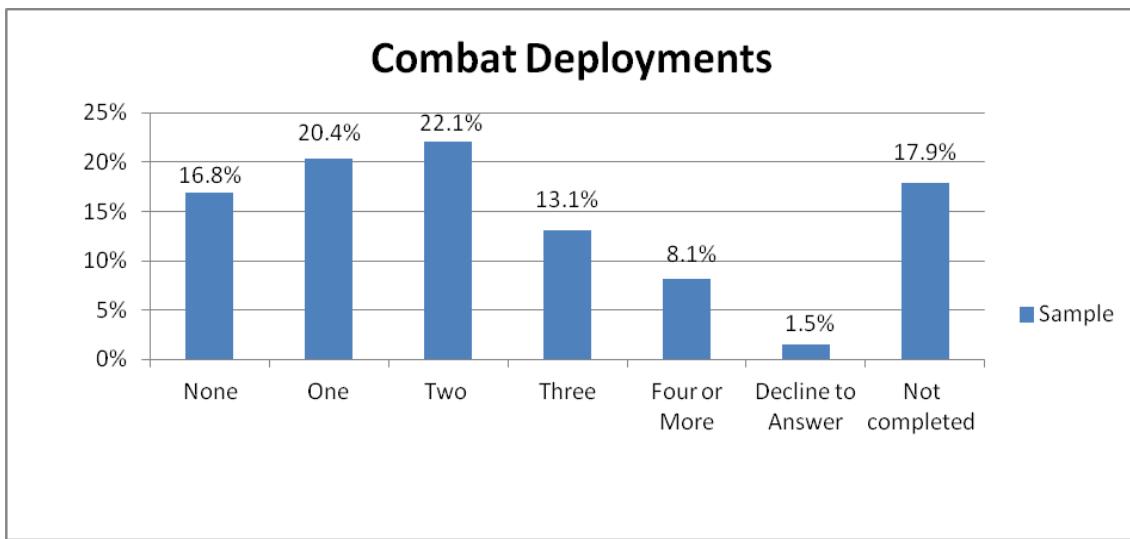


Figure 7. Percentage Distribution of Survey Respondents by Number of Combat Deployments (after LimeSurvey, 2014)

g. Recruiter or Drill Instructor

Figures 8 and 9 show whether survey respondents ever served as a recruiter or drill instructor. As seen in Figure 8, there is a fairly equal split between those having served as recruiters during some point in their career, compared with those having never served as a recruiter. Researchers believe this comparison is important when supporting survey respondents' answers regarding difficulties in recruiting. Given the percentage of Marines having served as recruiters, one can assume they understand the rigors of recruiting young women to contract and ship to boot camp as well as the challenges associated with training them to a certain standard.

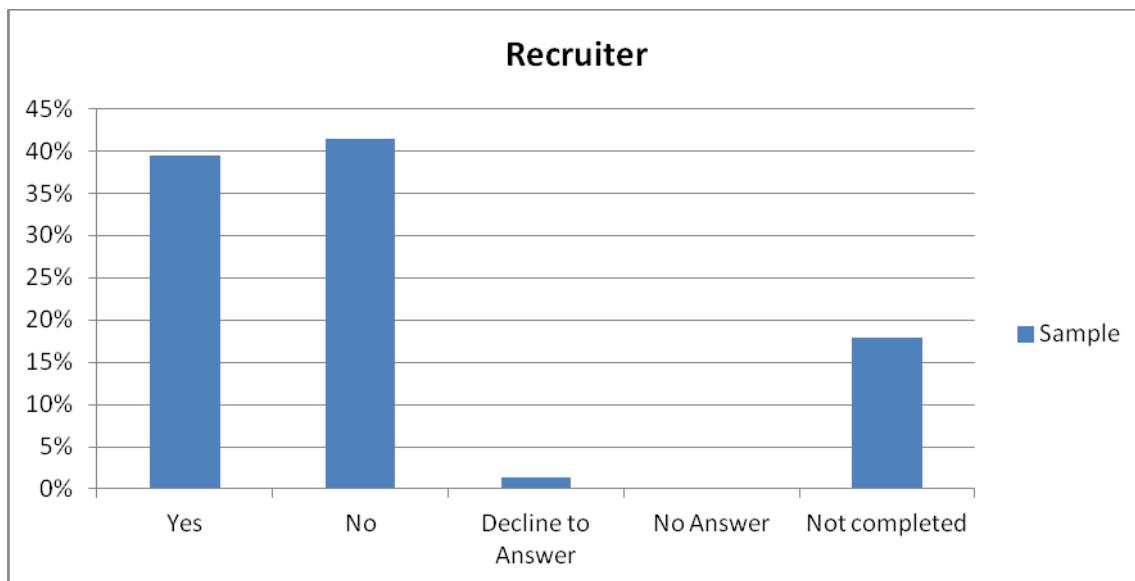


Figure 8. Percentage Distribution of Survey Respondents as a Recruiter
(after LimeSurvey, 2014)

As seen below in Figure 9, fewer than 20 percent of the respondents ever served as a drill instructor. This comparison is considered important when supporting survey respondents' answers regarding difficulties in recruiting and a trainee's likelihood to attrite. Drill instructors are direct beneficiaries of the recruiting process. Marines serving as drill instructors bear the burden of training to the "Marine" standard and would therefore understand the challenges of achieving a standard not always introduced prior to boot camp.

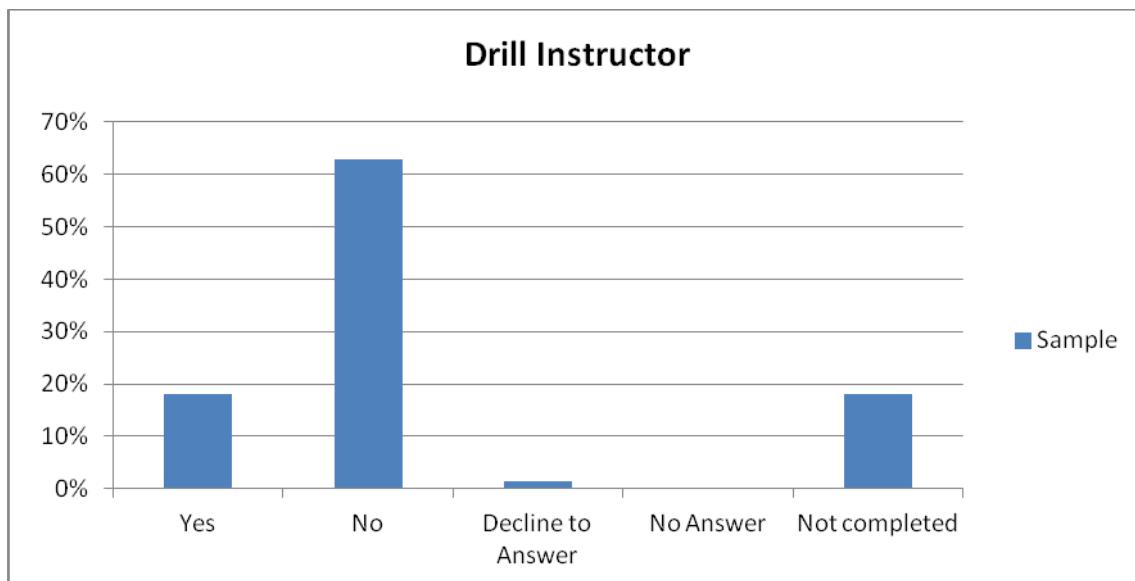


Figure 9. Percentage Distribution of Survey Respondents as a Drill Instructor (after LimeSurvey, 2014)

2. Conclusion

A survey response rate of 11.5 percent is relatively low considering the controversial gender-equality issue surrounding the PFT policy change. The low response rate might be due to the survey not reaching all of its intended participants, Marines not having the time to complete the survey during duty hours, Marines being unfamiliar (or uncomfortable) with a third-party survey tool (LimeSurvey), and the anonymous nature of their participation. As part of an exploratory study, the survey was administered to “feel the pulse” of Marines within ERR, not to generalize about the opinions or experiences of Marines in any way. Obviously, Marines in ERR who feel most strongly about this topic were more inclined to respond to the survey; and, understandably, mission requirements and responsibilities likely leave little time for surveys and the like. As it turned out, the survey provided a useful means for Marines to voice their opinion, evidenced most strongly in the fact that 48 percent of respondents took the time to submit additional comments.

The next chapter discusses survey results, along with a comprehensive review of these comments.

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IV. SURVEY RESULTS

A. OVERVIEW

In this chapter, survey results are discussed and conditional analyses are presented, where appropriate.

B. SURVEY

Marines who participated in this survey had mixed feelings toward the PFT policy change for both themselves and their fellow Marines. This chapter focuses on exploring these views, as shown in the responses to structured questions and in comments submitted by respondents. Only data received from fully-completed surveys were analyzed to provide a more balanced approach. The fields “No answer” and “Not completed or Not displayed” are generally neglected in this chapter, as they were discussed in Chapter III. Consequently, a total of 372 fully-completed surveys are used here. Demographics are employed to further study results in conditional analyses.

1. Policy

Questions in this section are intended to determine how Marines feel about the policy change. Questions are designed to explore if the policy has affected the way respondents perceive female Marines and their equality with male counterparts, as well as the effect the policy may have on female promotability, attrition, and recruiting. All questions in this section offer the same choice answers: “Strongly Agree,” “Agree,” “Neutral,” “Disagree,” “Strongly Disagree,” and “I decline to answer this question.”

a. *Equality and Viewpoint*

Questions 2 and 3 ask respondents if they believe the policy change creates closer equality between the sexes in the Marine Corps, and if respondents believe their view of the female Marines they know has improved because of the change. Figures 10 and 11 show their answers. As seen in Figure

10, 56.3 percent of respondents Strongly Agree or Agree that pull-ups creates closer equality between the sexes, with 17.2 percent feeling neutral about the change, and a combined 12.3 percent who Strongly Disagree or Disagree that the change has created equality.

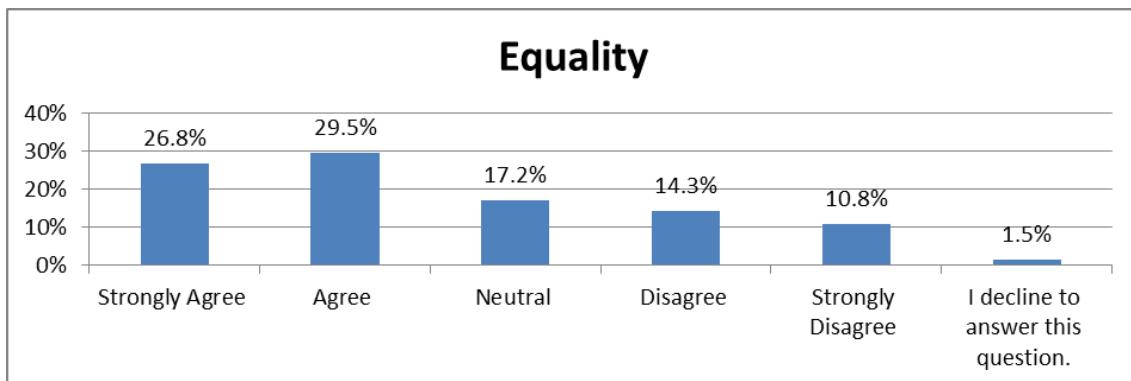


Figure 10. Summary for Equality (after LimeSurvey, 2014)

Question 3 asks survey takers if their view toward the females they know in the Marine Corps has improved due to the policy change. Figure 11 shows that about one-quarter of respondents Strongly Agree or Agree that their view toward females has improved due to the policy change. At the same time, 29.8 percent of respondents are neutral toward the females they know due to the policy change, and a combined 43.8 percent say they Strongly Disagree or Disagree that their view toward females they knew in the Marine Corps has improved.

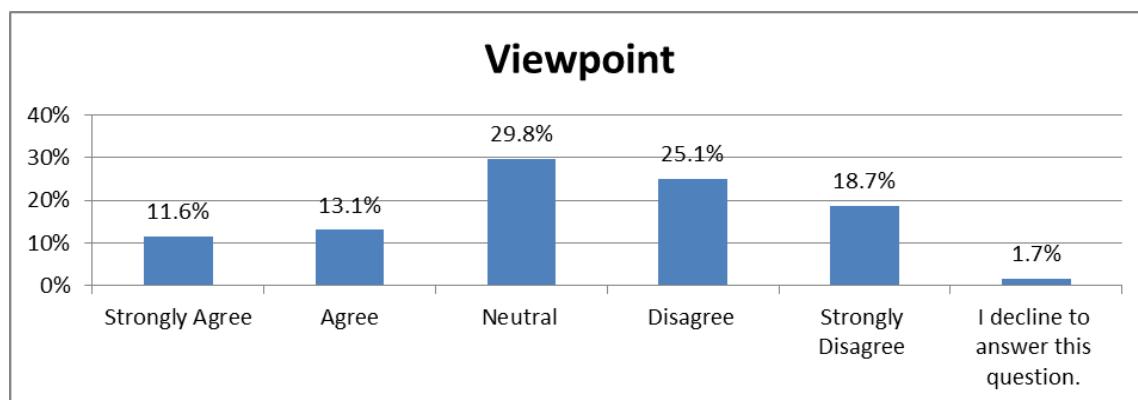


Figure 11. Summary for Viewpoint (after LimeSurvey, 2014)

b. Promotability

(1) Female Marines. Questions 4 and 5 on the survey ask respondents if they believe the policy change might affect female Marines' promotability adversely or positively. Note their responses in Figures 12 and 13.

In Figure 12, respondents Strongly Agree or Agree by 60.7 percent that female Marines' promotability will be affected *adversely*, whereas 15.2 percent feel neutral about it, and 22.6 percent Strongly Disagree or Disagree.

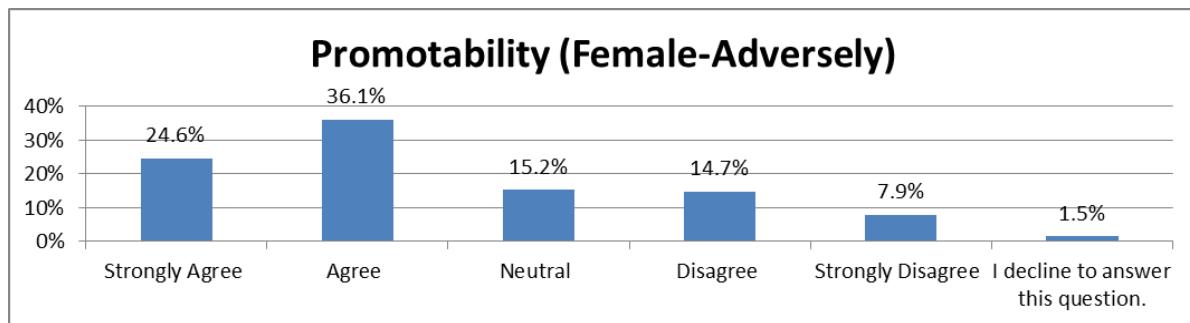


Figure 12. Summary for Promotability (Female-*adversely*)
(after LimeSurvey 2014)

Conversely, a similar question was posed in a positive format: "The PFT change for *females* could affect female Marines' promotability *positively*." It was expected that percentages would be closely related when comparing the adverse and positive effects of promotability for female Marines; however, the respondents' answers did not show that, as seen in Figure 13. As seen here, a combined percentage of 41.3 percent Strongly Agree or Agree that the PFT change could affect female Marines' promotability *positively*, whereas 24.6 percent feel neutral about it, and 32.2 percent Strongly Disagree or Disagree that the policy change will affect females positively.

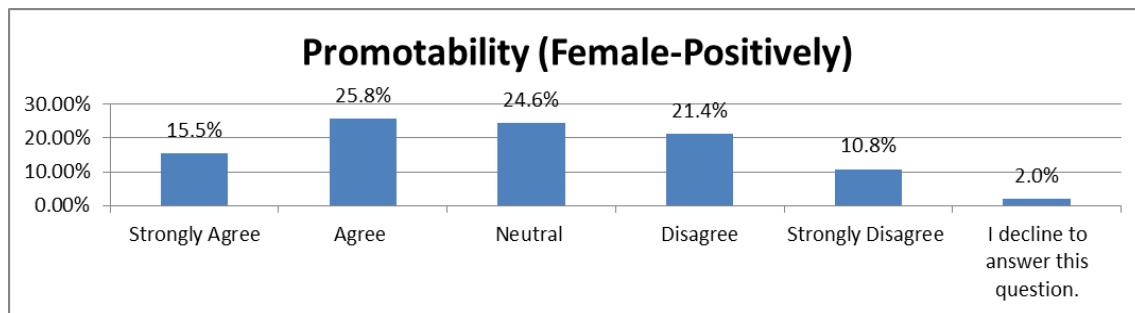


Figure 13. Summary for Promotability (Female-positively)
(after LimeSurvey, 2014)

(2) Male Marines. Questions 6 and 7 are similar to questions 4 and 5, but target the respondent's belief of the positive or negative effects of the policy change on *male* Marines. Note the responses in Figures 14 and 15.

In Figure 14, respondents Strongly Agree or Agree by 8.8 percent that male Marines' promotability will be affected *adversely*, whereas 20.4 percent feel neutral about it, and 69.5 percent Strongly Disagree or Disagree.

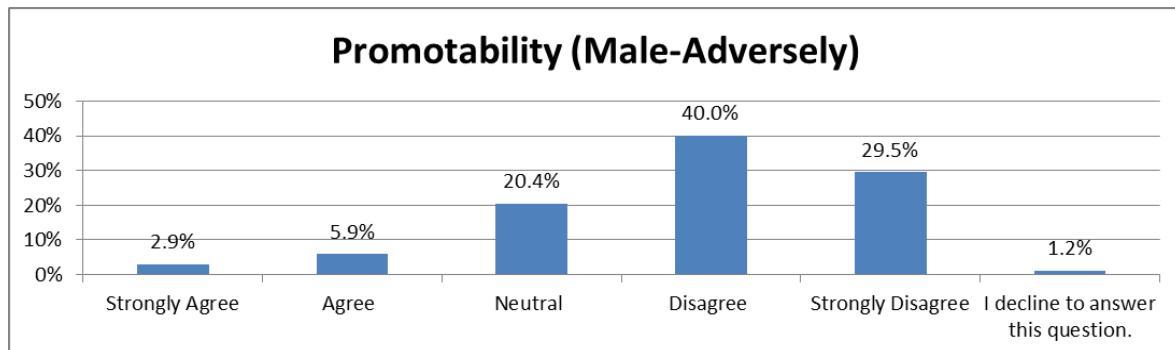


Figure 14. Summary for Promotability (Male-adversely)
(after LimeSurvey, 2014)

Conversely, researchers asked a similar question posed in a positive format: "The PFT change for *males* could affect male Marines' promotability *positively*." Once again, it was anticipated that percentages would be inversely related when comparing the adverse and positive effects of promotability for male Marines. As it turned out, this did not occur. As seen in Figure 15, a combined percentage of 28.2 percent Strongly Agree or Agree that the PFT change could

affect male Marines' promotability positively, whereas 29.5 percent feel neutral about it, and 40.5 percent Strongly Disagree or Disagree that the policy change will affect males positively.

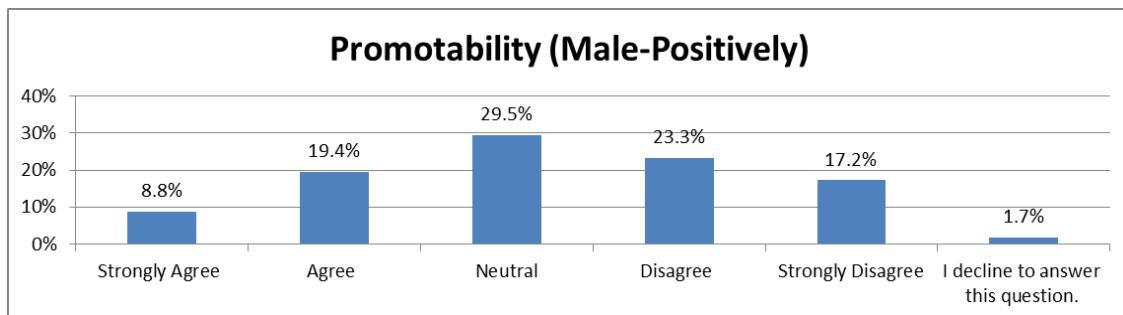


Figure 15. Summary for Promotability (male-positively)
(after LimeSurvey, 2014)

c. ***Upper-Body Strength for Combat Deployment***

Question 8 asks respondents for their opinion based on operational experience. Given that demographic data show almost 75 percent of respondents completed at least one combat deployment during their career, researchers were particularly interested in knowing whether respondents believed that pull-ups are a better measure than the flexed-arm hang of the upper-body strength required for a Marine combat deployment. Notice that in Figure 16, whereas 67.3 percent of respondents Strongly Agree or Agree, 14.3 percent feel neutral about it, and 16.7 percent Strongly Disagree or Disagree with that statement.

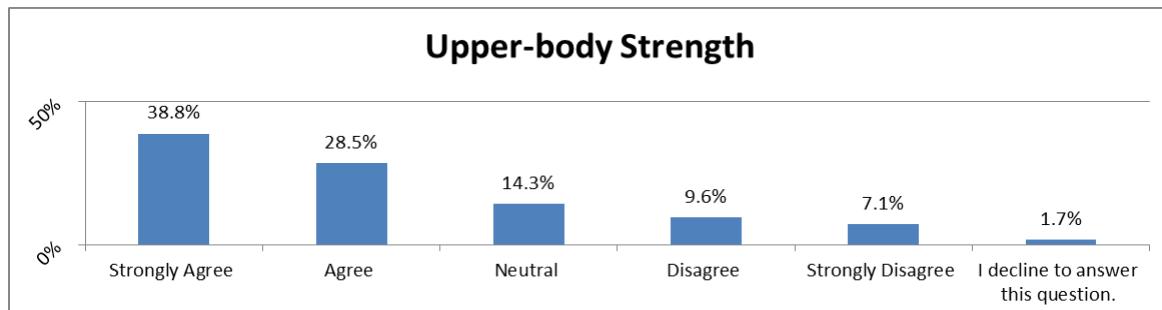


Figure 16. Summary for Upper-body Strength (after LimeSurvey, 2014)

d. Grandfathering, Broken Faith, and Early Attrition

Researchers asked questions 9, 10 and 11 to inquire about Marines' feelings toward the policy change, whether respondents believed a "grandfathering" protection should be written into the policy in the future, to gauge feelings of leadership loyalty toward Marines, and whether the policy change will affect their personally planned career length. See Figures 17–21.

(1) Grandfathering. Figure 17 shows whether respondents believe the policy change should be waived for females closer to retirement. As seen, a combined 43.8 percent of Marines Strongly Agree or Agree a grandfathering clause should be implemented into the policy, whereas 13.5 percent felt neutral about it, and 40.8 percent of survey takers Strongly Disagree or Disagree that the policy should include a grandfathering clause.

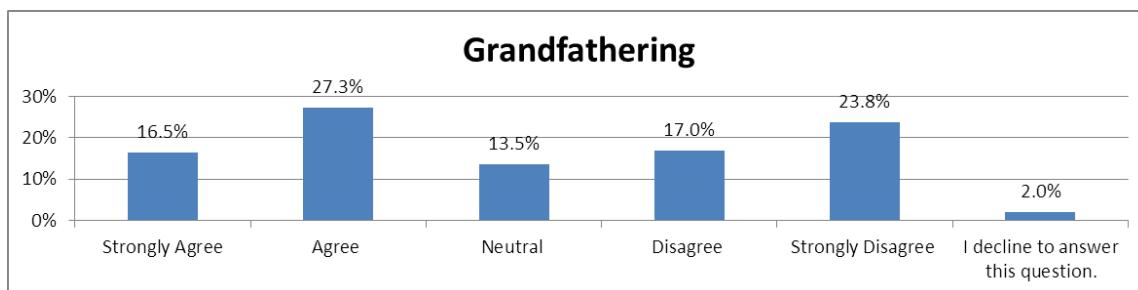


Figure 17. Summary for Grandfathering (after LimeSurvey, 2014)

(2) Conditional Analysis for Grandfathering. Of respondents who chose to answer the question, researchers conducted conditional analysis to ascertain if data show differences between gender decisions for the grandfathering clause. As seen in Figure 18, 60.2 percent of female respondents Strongly Agree or Agree the policy should grandfather females closer to retirement. This compares with 47.7 percent of males who Strongly Agree or Agree. Alternatively, 38.9 percent of females Strongly Disagree or Disagree, and 52.2 percent of male respondents Strongly Disagree or Disagree that females who are closer to retirement should be grandfathered. The Chi-squared test for the contingency

table analysis reveals sufficient evidence to reject the null hypothesis, that there are no differences between the feelings of males and females of this matter (p-value = .0247). Therefore, while aggregate responses to this question were fairly balanced, we see a distinct difference in opinion by gender.

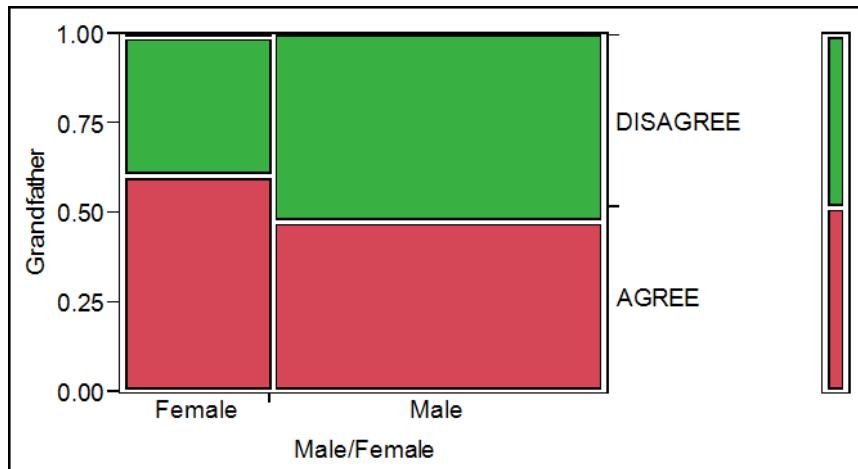


Figure 18. Summary for Conditional Analysis: Grandfathering (after LimeSurvey, Analysis Completed in JMP Pro 9.0)

(3) Broken Faith. Figure 19 shows whether respondents believe Marine Corps leadership has “broken faith” with its female Marines by changing the PFT policy. A combined 17.7 percent of respondents Strongly Agree or Agree to this statement, whereas 20.2 percent felt neutral about it, and 57.9 percent Strongly Disagree or Disagree.

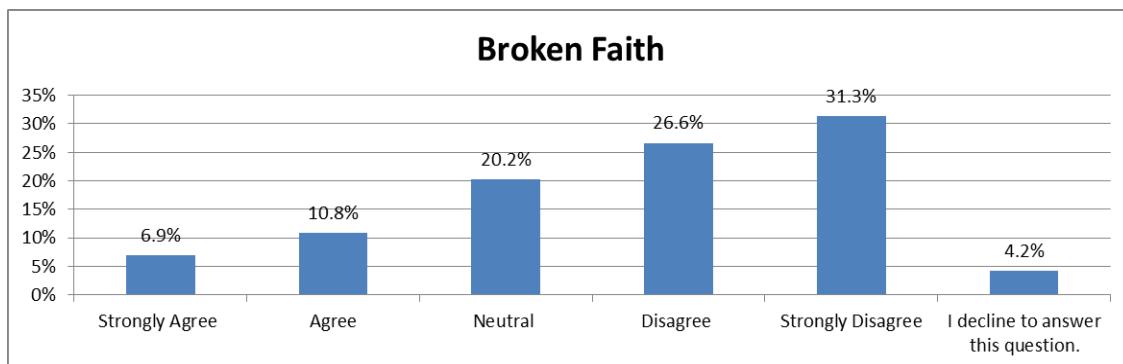


Figure 19. Summary for “Broken Faith” (after LimeSurvey, 2014)

(4) Conditional Analysis for “Broken Faith.” Of respondents who chose to answer the question, researchers analyzed “broken faith” data from a male and female perspective, by conducting a conditional analysis similar that above. Researchers once again created two groups from demographic data, male and female. As seen in Figure 20, 39.4 percent of female respondents Strongly Agree or Agree that the Marine Corps policy change has “broken faith” with female Marines, and only 15.4 percent of males Strongly Agree or Agree. At the same time, 60.6 percent of females Strongly Disagree or Disagree that the Marine Corps has broken faith, along with 83.7 percent of males who Strongly Disagree or Disagree. The Chi-squared test for the contingency table analysis reveals sufficient evidence to reject the null hypothesis, that there are no differences between the feelings of males and females of this matter (p -value $< .0001$). While a majority of respondents do not feel that the Marine Corps has broken faith with female Marines, a higher proportion of female Marines than male Marines believe that leadership has broken the faith.

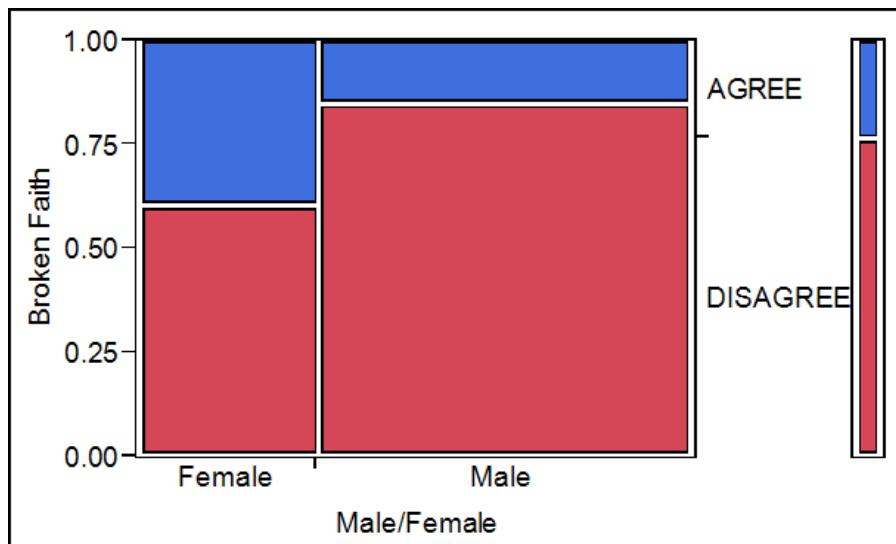


Figure 20. Summary for Conditional Analysis: “Broken Faith”
(after LimeSurvey, Analysis Completed in JMP Pro 9.0)

(5) Career Length. Question 11 asks survey takers whether they believe the policy change will affect how long they plan to stay in the Marine

Corps. As seen in Figure 21, a combined 13.6 percent of Marines Strongly Agree or Agree with this statement, while 12.8 percent felt neutral about it, and 70.9 percent Strongly Disagree/or Disagree.

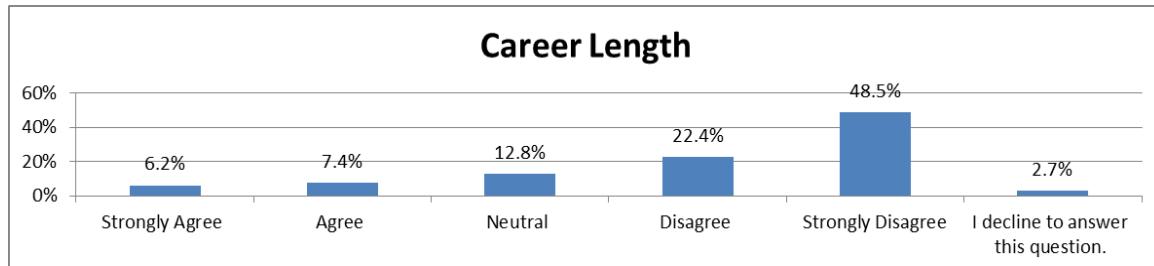


Figure 21. Summary for “Career Length”
(after LimeSurvey, 2014)

e. *Recruiting*

Questions 12 and 13 on the survey ask respondents if they believe the policy change for females might make it more difficult (or easier) for recruiters to enlist females into the Marine Corps. Overall survey responses for the sample are presented in Figures 22 and 23, respectively, with conditional analyses following in Figure 24 to provide a more detailed look.

(1) Recruiting More Difficult. Figure 22 shows responses to the statement, “the PFT policy change for females will make it more difficult for recruiters to enlist females into the Marine Corps.” Seventy percent of respondents Strongly Agree or Agree that the policy change will make it more difficult for recruiters to enlist females into the Marine Corps, while 8.4 percent do not express an opinion (neutral), and a combined 20.5 percent Strongly Disagree or Disagree that the policy change will make it more difficult for recruiters to enlist females into the Marine Corps.

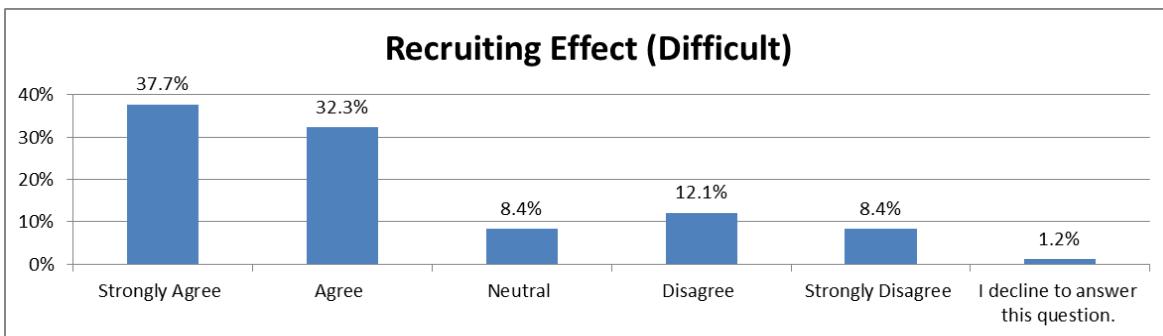


Figure 22. Summary for “Recruiting Effect (Difficult)”
(after LimeSurvey, 2014)

(2) Recruiting Easier. Conversely, the survey presented a similar statement expressed in a positive way, “The PFT policy change for females will make it easier for recruiters to enlist females into the Marine Corps.” Again, researchers anticipated that responses would correspond inversely with those shown for the previous question. Although not exact, the results were as expected. Figure 23 shows a combined percentage of 2.4 percent Strongly Agree or Agree, with 16.5 percent feeling neutral about the recruiting effect, while 79.8 percent Strongly Disagree or Disagree.

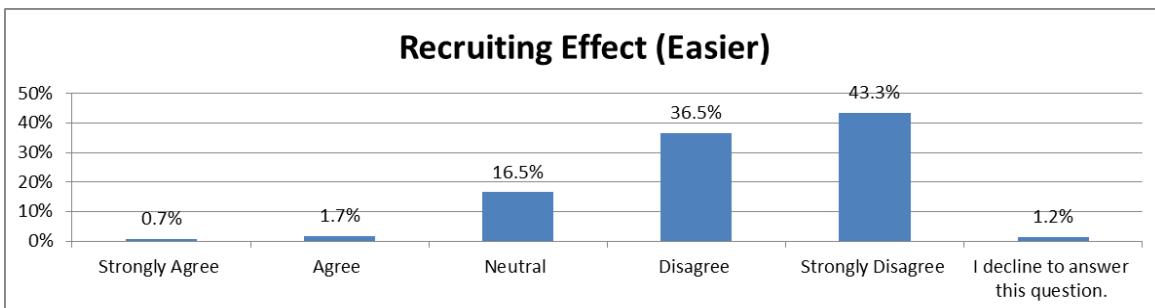


Figure 23. Summary for “Recruiting Effect (Easier)”
(after LimeSurvey, 2014)

(3) Conditional Analysis for Recruiting Effect. Conditional analysis was conducted to ascertain if respondents stating they have served as recruiters believe enlisting females will be more difficult. Two groups were created, “served as a recruiter” and “not served as a recruiter,” to analyze respondents’ answers.

Of respondents having served as recruiters, Figure 24 shows 83.4. percent Strongly Agree or Agree that it will be *more difficult* to enlist females into the Marine Corps. This compares with 71.9 percent of respondents who did not serve as a recruiter. Alternatively, 16.6 percent of those who served as a recruiter do *not* believe the requirement will make it more difficult to enlist females into the Marine Corps, along with 28.1 percent of those who never served as a recruiter. The Chi-squared test for the contingency table analysis reveals insufficient evidence to reject the null hypothesis, that there are no differences between the beliefs of those having served as a recruiter and those never served as a recruiter (p -value = .0105).

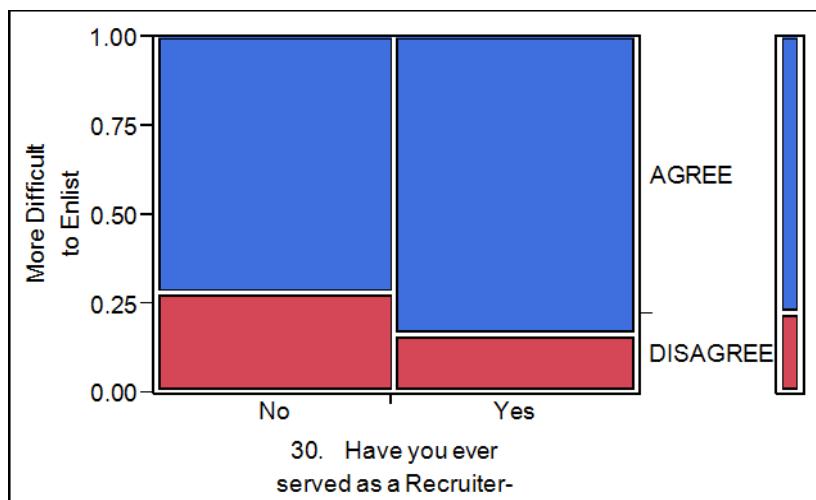


Figure 24. Summary for Conditional Analysis: Recruiting Effect
(after LimeSurvey, Analysis Completed in JMP Pro 9.0)

f. Attrition

Questions 14 and 15 on the survey ask respondents if they believe the PFT policy change for females will cause more recruits to be discharged or “attrite” from Marine Corps boot camp. Similar to the presentation of data for recruiting, mean responses for the sample are presented in Figures 25 and 26, respectively, whereas further analyses look at answers based on whether the respondent ever served as a drill instructor.

(1) Cause More Attrition. Marines were asked to agree or disagree with the statement, “the PFT policy change for females will cause *more* recruits to be discharged or ‘attrite’ from Marine Corps boot camp.” Figure 25 shows that 59.4 percent of respondents Strongly Agree or Agree that the policy change will cause more recruits to attrite, while 17 percent are neutral on the topic, and 22.2 percent Strongly Disagree or Disagree.

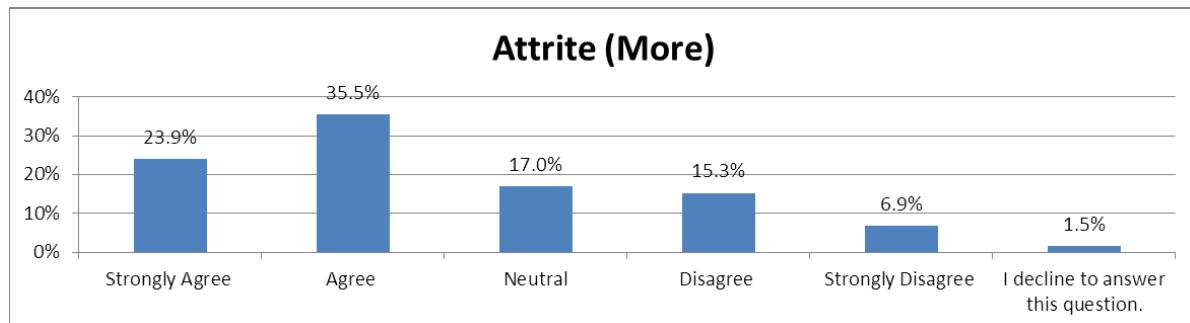


Figure 25. Summary for “Attrite (More)” (after LimeSurvey, 2014)

(2) Cause Less Attrition. Figure 26 shows responses to the statement, “the PFT policy change for females will cause *fewer* recruits to be discharged or ‘attrite’ from Marine Corps boot camp.” As seen here, 9.1 percent of respondents Strongly Agree or Agree that the policy change will cause fewer recruits to attrite, while 22.2 percent are neutral on the topic, and 67 percent Strongly Disagree or Disagree.

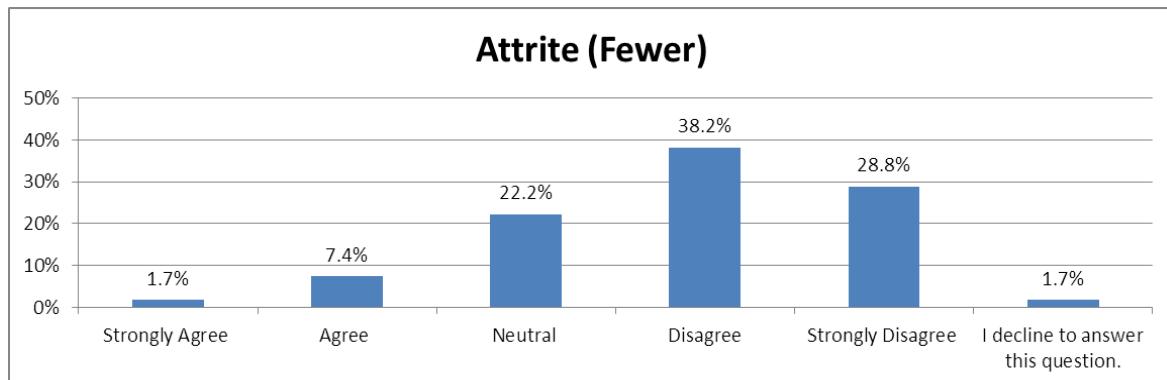


Figure 26. Summary for “Attrite (Fewer)” (after LimeSurvey, 2014)

(3) Conditional Analysis for Attrition. Conditional analyses were conducted to ascertain if respondents stating they have served as a drill instructor believe the new requirement will affect attrition in boot camp. Figure 27 shows how Marines having served as a drill instructor feel about whether the policy change will cause more or less recruits to attrite from Marine Corps boot camp. Former (or current) drill instructors' responses show that 71.2 percent feel Strongly Agree or Agree the policy change will cause more recruits to attrite; this compares with 72.5 percent of respondents with no experience as a drill instructor. Alternatively, 28.8 percent of former (or current) drill instructors Strongly Disagree or Disagree, compared with 27.5 percent of those with no experience as a drill instructor. The Chi-squared test for the contingency table analysis reveals insufficient evidence to reject the null hypothesis, that there are no differences between the beliefs of respondents who have served or not served as a drill instructor (p -value = .8365). These data tend to support the CNA study results showing increased challenges for female recruits to complete three pull-ups prior to graduation (CNA, 2014).

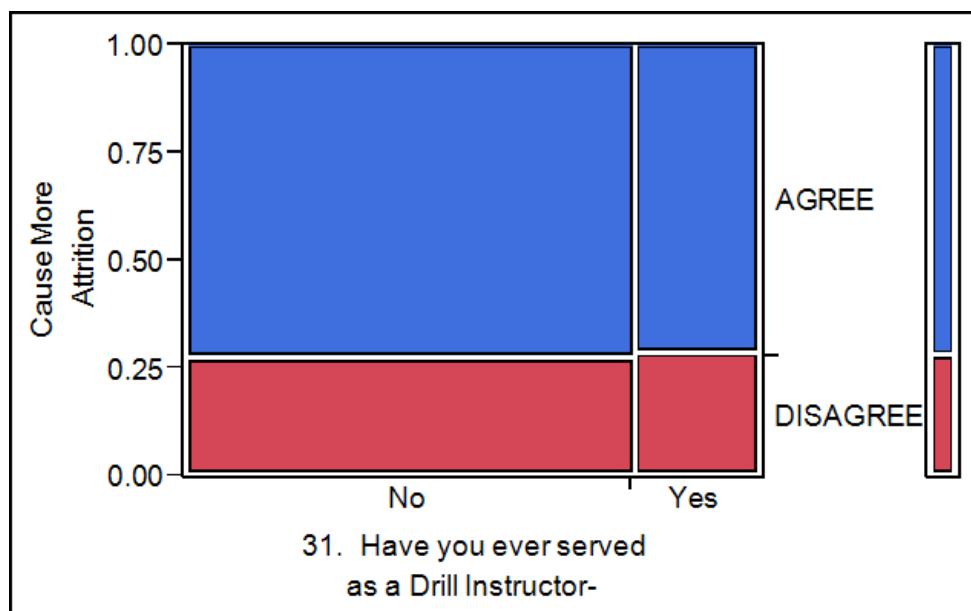


Figure 27. Summary for Conditional Analysis: Attrition Effect
(after LimeSurvey, Analysis Completed in JMP Pro 9.0)

2. Training

Questions in this section are intended to determine Marines' views about the connection between training and upper-body strength. Questions were asked of both male and female Marines in all MOSs. Given that Marines are directed to PT with their unit at least once per week (MCO P6100.12 w/Ch1, 2003), it was assumed that male and female workout relationships already exist, and might therefore lead to partnership workout plans to assist females in increasing their upper-body strength. More specifically, questions are designed to determine if Marines believe they have command support to extend their PT time to train to a new standard, if they utilized the training program posted on the TECOM website, and, if not, whether they utilized another program and if they needed to pay out of pocket. These questions can provide more information on how Marines are reacting to the policy change and whether they are using the tools provided by leadership to train to a new standard.

Questions within this section offer a variety of multiple-choice options, and always provided respondents with the option, "I decline to answer this question." Number of pull-up repetitions before policy change.

Question 16 asks respondents, "Prior to 27 November 2012, about how many pull-up repetitions could you do at one time?" (The question then cites a reference for Marines to define "pull-up," if needed.) This question is intended to set a baseline for asking future training questions and to determine the capabilities of all Marines, both male and female, to complete pull-ups prior to the new requirement. Figure 28 shows all respondents' answers, from 10.1 percent of respondents being able to complete "0" pull-ups, to 25 percent being able to complete "21 or more" pull-ups, and 2.1 percent declining to answer the question. The answer "0" is especially noteworthy at 10.1 percent of all respondents. Since female Marines comprise about 20 percent of the sample, and male Marines are required to do pull-ups on the PFT, this implies that roughly one-half of the female respondents could not do a single pull-up on the date the policy change was announced.

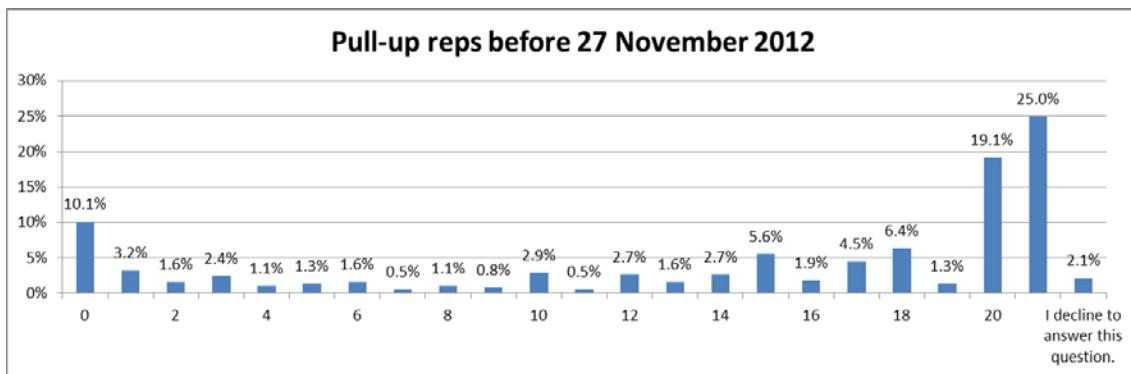


Figure 28. Summary for “Pull-up reps before 27 November 2012”
(after LimeSurvey, 2014)

a. ***Pull-up Training***

Questions 17 through 23 focus on the training that survey takers used to increase their upper-body strength to complete pull-ups, and whether they believe they had command support to increase their workout time for additional training. The questions were developed to ensure that males and females alike responded by adding an explanation about “increase in pull-ups” rather than simply training to “begin doing pull-ups.” As mentioned previously, it is assumed that relationships exist between Marines when working out. Consequently, the question seeks opinions from both males and females about the tools they believe can help them increase upper-body strength, whether these tools have worked, and if they had to pay out-of-pocket for any related expenses.

(1) Training Source. Question 17 asks survey takers if they have trained to do pull-ups using the program on the TECOM website (either training to increase their pull-ups or training to begin doing pull-ups). Figure 29 indicates that 9.6 percent of respondents actually used the tool provided by HQMC to increase their number of pull-ups, while 87.5 percent stated that they did not use the HQMC tool. This question might indicate the level of confidence Marines have in the online tool available to them for training, or simply that male respondents do not feel the need for a new training source to increase their pull-ups.

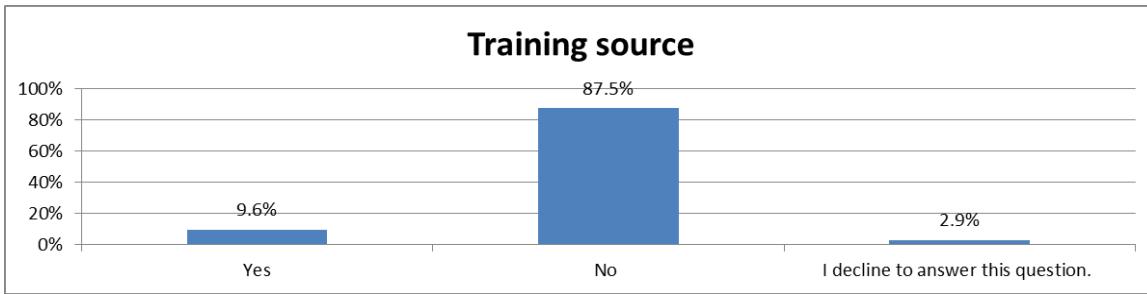


Figure 29. Summary for “Training Source” (after LimeSurvey, 2014)

(2) Effectiveness of Training Package. Question 18 asks, “If you have used the TECOM website, did this training package help you increase your number of pull-ups?” As seen in Figure 30, 4 percent of respondents stated “yes,” that they used the training package on the TECOM webpage and it helped them increase their number of pull-ups. At the same time, 5.9 percent of respondents feel the website did not help them increase their number of pull-ups, while 88.3 percent claim to have never used it.

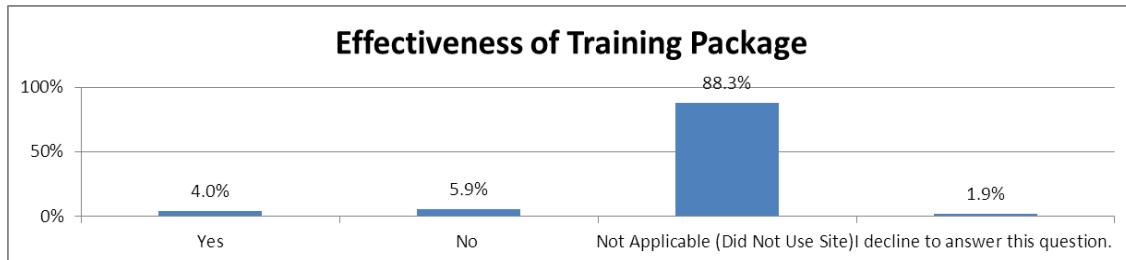


Figure 30. Summary for “Effectiveness of Training Package” (after LimeSurvey, 2014)

(3) Length of Use of Training Package. Figure 31 shows respondents’ answers to question 19, “If you have used the TECOM website, how long did you train to increase your number of pull-ups?” Of note here is that nine out of ten respondents did not use the training package. This corresponds closely with the proportion of respondents who stated that they did not use the site (Figure 30). As seen in Figure 31, a combined 8 percent of respondents claim to have used the training package for up to 6 months.

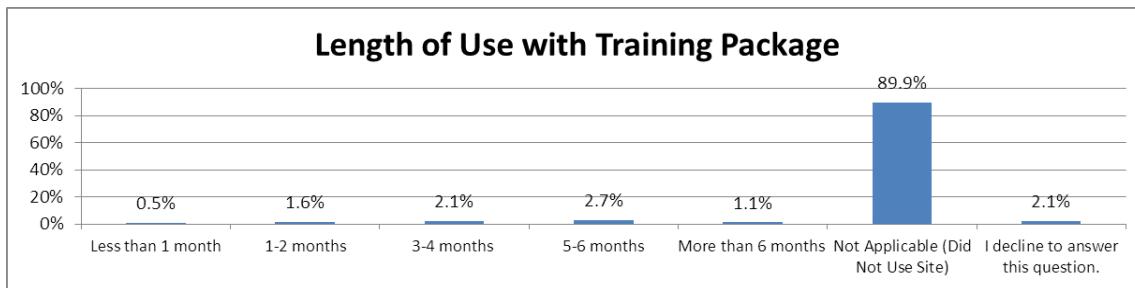


Figure 31. Summary for “Length of Use with Training Package”
(after LimeSurvey, 2014)

(4) Command Support. Question 20 asks Marines if they felt they had command support to extend their PT time weekly to train for pull-ups. As mentioned in Chapter II, and indicated on the TECOM website for training to do pull-ups, the training package was intended to “complement” the physical training programs of Marines, therefore requiring additional time and effort. This question was developed to see if Marines felt they had received command support to take additional physical training time during working hours, thus conveying the level of acceptance for the policy change from leadership and throughout their unit. The question reads, “I had (have) command support to extend my PT time weekly to train for pull-ups. (This question refers to the amount of time you are (have been) allotted to PT during working hours).” Figure 32 shows that roughly one-third (34.6 percent) of respondents Strongly Agree or Agree they had (or have) command support. Conversely, 26.9 percent of respondents Strongly Disagree or Disagree, while 29.3 percent felt they could neither agree nor disagree.

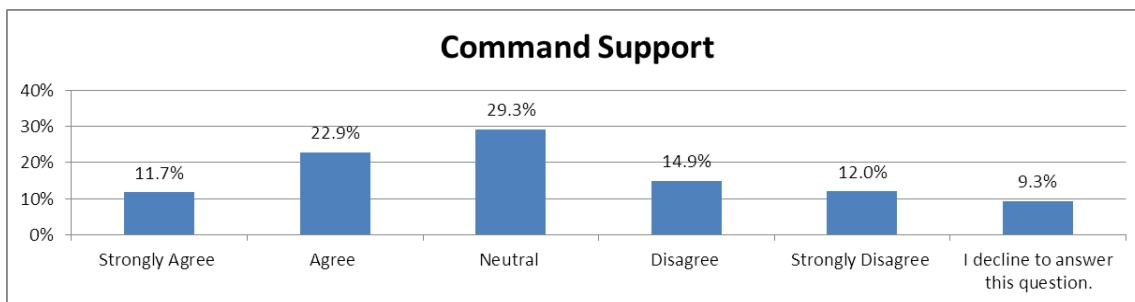


Figure 32. Summary for “Command Support” (after LimeSurvey, 2014)

(5) Used Different Training Regimen. Question 21 asks Marines if they “trained to do pull-ups using a different regimen than posted on the TECOM website?” As seen in Figure 33, 67.8 percent of respondents indicated that they had used a different training regimen than the one posted on the TECOM website. At the same time, 19.9 percent stated they did not train to do pull-ups using a different regimen than the one posted, and 4.3 percent stated they used a combination of tools. Curiously, a relatively high proportion of respondents (8 percent) declined to answer this question.

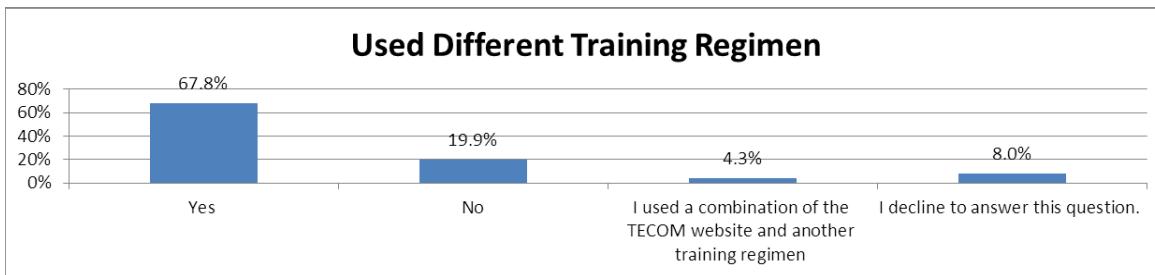


Figure 33. Summary for “Used Different Training Regimen”
(after LimeSurvey, 2014)

(6) Increase with Different Training Regimen? For respondents who stated that they used a training regimen other than the TECOM website, even if only supplemented, question 22 asks, “did it help you increase your number of pull-ups?” As seen in Figure 34, nearly three-quarters (71.5 percent) of respondents stated that a different training regimen helped them to increase their number of pull-ups. This compares with 10.1 percent who answered in the negative. Another 18.3 percent did not use a different training regimen or declined to answer.

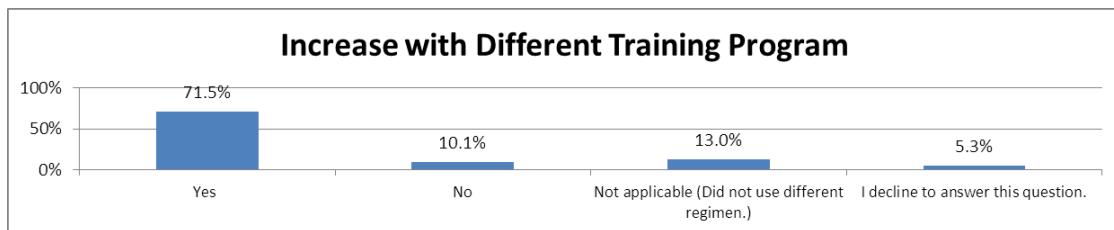


Figure 34. Summary for “Used Different Training Regimen”
 (after LimeSurvey, 2014)

(7) Paid Out-of-Pocket for Different Training Regimen. Question 23 asked respondents who used a training regimen other than the program on the TECOM website, if they paid out-of-pocket expenses for that training. This question was included to gauge the pressure placed on Marines to increase their pull-up capacity, particularly among females who would use personal funds to train. Further, answers to this question may indicate how unsure certain respondents are about the training tools provided, given they felt the need to pay out-of-pocket. Figure 35 shows that 24.7 percent of survey respondents did not use another training regimen, but a combined total of 65.2 percent *did* use a training regimen other than the one published by TECOM. A total of 10.7 percent admitted to paying out-of-pocket for a training program to increase pull-ups, with about half of these spending up to \$50 per month.

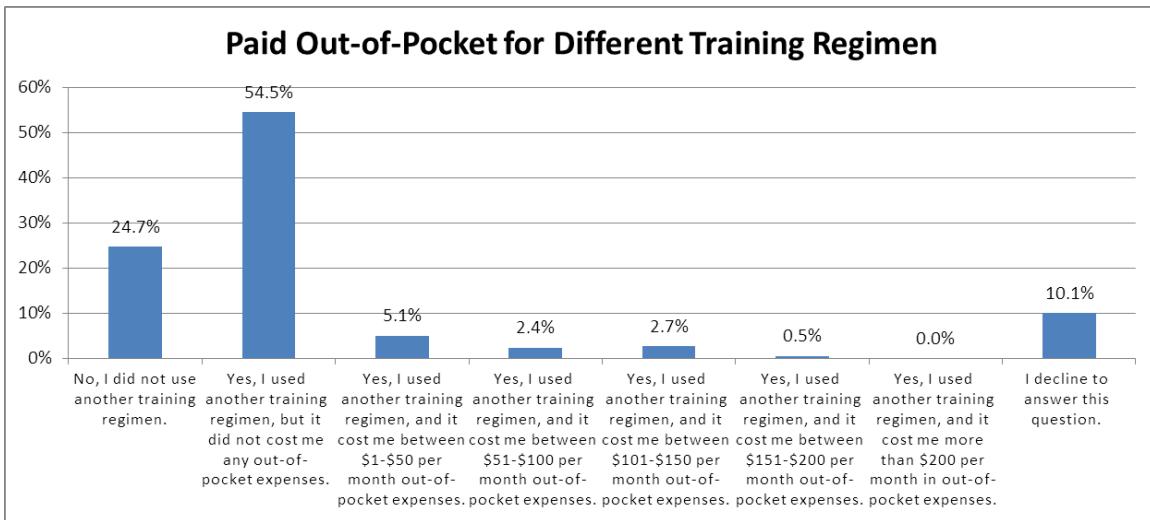


Figure 35. Summary for “Used Different Training Regimen” (after LimeSurvey, 2014)

3. Comments

Item 32 of the survey invites Marines to express their views on any topic. The invitation simply states the following: “Please feel free to share any comments below.” Surprisingly, almost half of all respondents (48 percent of fully completed surveys) chose to submit a personal comment. These comments are useful in identifying and understanding areas that are considered most important by respondents when discussing the policy change.

Recognizing the value of the many comments—from 180 respondents—a content analysis was undertaken by placing these comments into 4 categories. Note that some comments fall within more than one category and are therefore counted multiple times. The categories are: (1) comments that “support” the policy change, (2) comments that “question the policy change, (3) comments that raise equity concerns, and (4) comments that refer to someone (the respondent or others) who is struggling to meet the standard. Two researchers completed independent bin assignments, which were then combined into one document. If one researcher assigned a comment to a bin but the other did not, that comment remained in the bin. Comments were not counted twice in the same bin. Distribution analysis was then completed using JMP Pro 9.

Figure 36 shows the number of comments by each of the four categories. As seen here, half of the comments made by respondents (90) stated they support the policy change, with 61 questioning it, and 84 raising equity concerns. On numerous occasions, respondents stated that they supported the policy change and then proceeded to question it ("I support it, but"); in these cases, researchers believed the comment should be assigned to both categories. Without prompting specific input, 20 comments stated that they are (or are aware of others) struggling to meet the standard. Researchers believe this question is important to highlight those vulnerable enough to admit they (or someone they know) are struggling to meet the new pull-up standard.

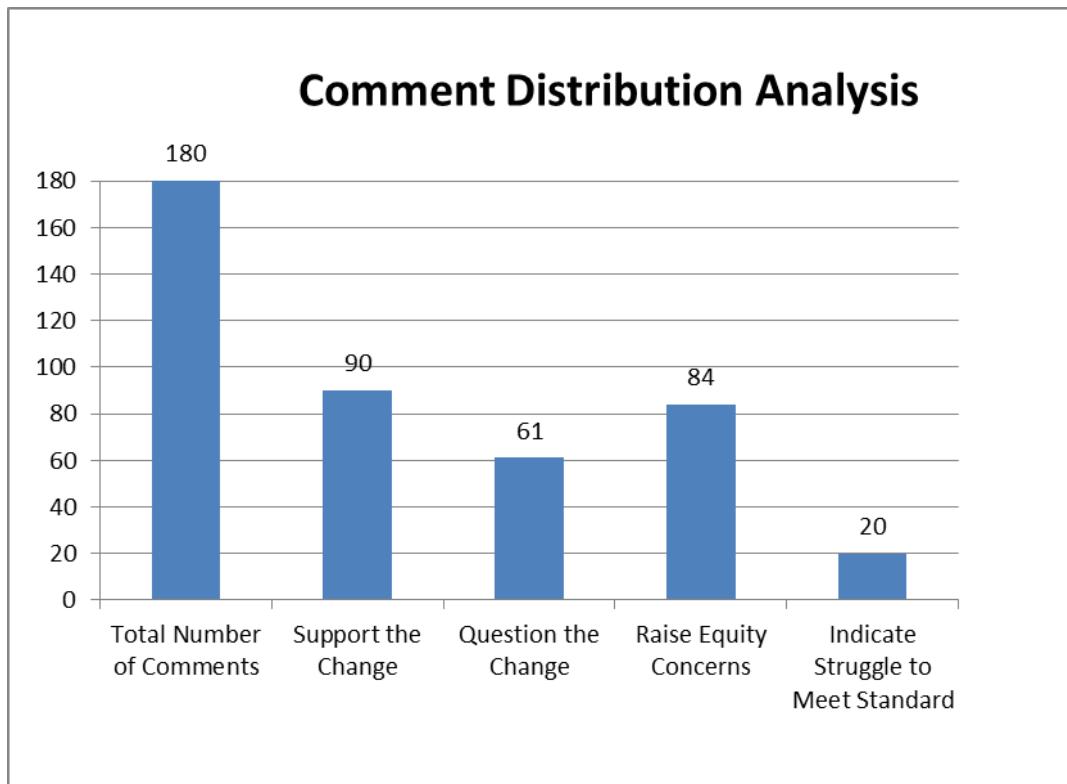


Figure 36. Distribution Summary for Comments (after LimeSurvey, 2014)

C. CONCLUSION

The survey was designed to give Marines in ERR an opportunity to voice their opinion regarding the PFT policy change for females doing pull-ups,

determine these Marines' views of available training tools and their effectiveness, and comment on whatever they deemed most important for researchers to know.

The survey results are examined by content area. Further conditional analyses were conducted on respondents' beliefs of the "grandfathering clause" by gender, "broken faith" by gender, "attrition beliefs" by drill instructors, and "recruiting beliefs" by recruiters. These further analyses help to identify possible trends by specific groups and inform future decisions regarding the PFT policy. The next chapter summarizes the results of interviews with two physical fitness experts.

V. INTERVIEW RESULTS

A. OVERVIEW

This chapter summarizes the results of interviews with Robert Fontecchio and Mike Healy, co-owners of Systematic Crossfit in Pacific Grove, California.

B. INTERVIEWS

The interviews provide valuable insight into two experts' opinions on overall fitness and building upper-body strength for both males and females. Researchers created unique questions for the co-owners and trainers of Systematic CrossFit, Robert Fontecchio, and Mike Healy. These questions are presented as Appendix G and Appendix H, respectively. Questions were derived by keeping in mind their individual certifications that extend beyond their Crossfit Training 1 certifications, as both trainers have extensive complementary education and expertise supportive of a holistic approach to physical fitness. Interview questions also ask for their views regarding the upper-body strength-training program currently located on the TECOM website, to provide possible recommendations for improvement and further success of the program.

1. Robert Fontecchio

Co-Owner/Coach of Systematic Crossfit Gym in Pacific Grove, California, Fontecchio is a CrossFit Level 1 certified instructor, CrossFit Olympic Weightlifting certified instructor, orthopedic massage therapist, CMT, Titleist Performance Institute certified fitness instructor, and Functional Movement Systems (FMS) certified professional. Fontecchio is also a co-owner of a sports therapy private practice in Pacific Grove, CA, named Diversified Soft Tissue Therapy (DSST), which focuses on integrative myofascial and myoskeletal health.

As stated in Chapter III, the interview with Fontecchio occurred on Wednesday, February 12 at 1 pm. At his request, the meeting location was

moved to a local cafe named Tillie Gort's, one block east of the Systematic Crossfit gym, and located on Lighthouse Avenue in Pacific Grove. This last-minute location change was due to his schedule. Fontecchio signed the NPS IRB Consent to Participate in Research form on February 9, 2014. Upon signing, he was provided a copy of the interview questions, along with the upper body-training program located on the TECOM website, at that time.

Fontecchio preferred to start the conversation with an inquiry as to why Marine Corps leadership wanted to make female Marines do pull-ups. The discussion took a short detour as annual physical fitness requirements for all Marines were discussed, the importance of remaining physically fit for deployments, the combat load, and even the staffing policy change for females allowing female Marines to be assigned within their own MOS at infantry units below the Division level. It also included a brief explanation of the semi-annual requirement for the PFT (events for males vs. females), as well as the semi-annual requirement for the CFT. Fontecchio was very receptive, and stated that he understood and agreed that all service members have a responsibility to stay physically fit, and that he also understood that the Marines' reputation lends itself to being one of the toughest services physically. He also stated, however, that from his viewpoint, training people the exact same way for a "general" fitness level typically does not work. Everyone has a different capacity, different threshold, and, therefore, needs to have a different training regimen. Next, he made an interesting statement:

It sounds like someone is asking the wrong question. Why are we trying to make females meet the same physical standard as males when they have other strengths far different than any male ever could? Shouldn't it be something like: How can we as a nation capitalize on the strengths of males and females in our military to become a stronger force overall in war? Isn't the large infantry force dying? (Fontecchio, 2014)

Fontecchio further stated that he has some "Special Forces" friends living in the San Diego area, persons with whom he previously trained and still remains in contact. He further acknowledged training each of them separately based upon

their requested outcome, and noted their different inputs leading to different outputs, even though their goals were very similar. He further elaborates on his definition of “inputs” and “outputs.”

According to Fontecchio, inputs mean the whole person is ready to train, with a specified age, specified body type, specified level of functional movement due to injury, strain or atrophy, and even specified weight. These inputs are more important than gender, although, on average, females typically train to a standard about 30 percent less across the board in a civilian setting. His expectation for a military setting with “general fitness” levels being higher than civilian might lead to females training to a standard of about 15 percent less. Admittedly, in his own practice, however, and as a CrossFit standard, weights prescribed are typically about 30 percent less to prevent injury. As he observes:

It is physiologically proven that men build more upper-body strength faster than women. This isn't a male/female problem; it's an input problem. If you're going to be exclusive, then be exclusive intelligently by changing those inputs (meaning neuroendocrine responses to start building muscle fibers in desired areas where deficient). In this case, we're talking deficiency in upper-body strength for women. (Fontecchio, 2014)

In training females to develop upper-body strength, Fontecchio felt that a good start would be to look at deficit training models that have their roots within physical therapy. These models are a great starting point for someone working muscles they have never used before, or to re-fire-up muscles used years ago. He also stated that muscle adaptation for females is different from that of men; in other words, women tend to peak later. Females typically peak between ages 26–35, whereas males peak at ages 23–28. The good thing is that bringing anyone to a general baseline (with the right inputs) is actually easier. In terms of the training program published on the TECOM website, he finds:

It's not overall garbage, but it won't be fully successful. It looks like it's a compromised program, like the developer couldn't decide whether he wanted volume, train for hypertrophy, use volume for endurance...etc. or try to squeeze strength out of redundancy and agonist movements. This program looks like a great way to

overwork someone. I don't see a balanced antagonist and agonist ratio; there is too much stress on the agonist for the pull. (Fontecchio, 2014)

Lastly, Fontecchio asked if the training program he was reviewing was for recruits at basic training. Researchers were unable to answer this question confidently, as although part of this paper discusses a PT playbook used at Parris Island, researchers were not able to compare that playbook with the currently published training program for all Marines. Fontecchio made his point, regardless, that success of any physical fitness program that involves pulling oneself over a bar would be very difficult to measure, unless controls are in place for all the inputs, and especially, weight fluctuations. His point was that maybe people did not actually gain any more upper-body strength on a program, but lost weight. In doing so, they changed their body mass/muscle ratio, and thus were successful in pulling their lessened body weight above the bar. It is a simple change in ratio, not necessarily an increase in strength (Fontecchio, 2014).

2. Mike Healy

Co-owner/coach of Systematic Crossfit Gym in Pacific Grove, CA, Mike Healy is our next interviewee. He is a program design and nutrition Coach, as well as CrossFit Level 1 certified instructor, CrossFit Endurance certified, CrossFit Mobility certified, CrossFit Nutrition certified, USAW Sports Performance Coach Level 1, and certified by the National Academy of Sports Medicine (NASM CPT) to coach fitness. Healy is also co-founder of "Fuel Your Potential," an organization specializing in personal training, individual program design, nutrition, life and health coaching, also located on the Monterey Peninsula.

As stated in Chapter III, the interview with Healy occurred on Friday, February 28 at 9 am. The meeting location was at the Systematic Crossfit gym located at the American Tin Cannery near the Monterey Bay Aquarium. Healy signed the NPS IRB Consent to Participate in Research form on February 15, 2014. Upon signing, he was provided a copy of the interview questions, along with the upper body-training program located on the TECOM website, at that time.

When asked to define being “physically fit,” Healy gave an answer often heard in the research community: “it depends.” It depends, he said, on the fitness being tested:

As a General Fitness-I, look to have an individual able to bench press at least ¾ their body weight, back squat at least their body weight, deadlift 1.5 times their body weight, complete 5 or more strict pull-ups (unbroken), complete 30+ sit ups unbroken, and 20+ pushups unbroken. They should have a <7 min mile, and less than a 22 min-3 mile. (Healy, 2014)

His general fitness statement above refers to males; however, he did state that females should not be far behind. He also stated that nutrition is extremely important in becoming physically fit, because without proper nutrition, specifically, the proper consumption of protein, building muscle is very difficult. Over-consumption of certain foods can also cause weight gain and a host of diseases—all of which can be controlled and corrected, he stated, with proper nutrition (Healy, 2014). Healy is fascinated with nutrition, and often holds nutrition workshops at Systematic Crossfit along with counseling personal clients through his business, “Fuel Your Potential.” During the discussion about nutrition, it was clear that Healy’s fascination with proper nutrition goes far beyond eating what he believes is healthy on a daily basis:

Diet and nutrition are actually on par with politics and religion; it’s that sensitive of a topic. You have the Vegan camp, those who can’t believe humans eat meat. You have the Paleo camp, those who can’t imagine humans eat grains, and everything in between. Lastly you have the camp, where people don’t even think about the food they’re putting into their mouth. They just throw a dinner in the microwave and have no idea, or don’t care, about what’s in their food. (Healy, 2014)

Healy provides the overall concept of being physically fit, as having numerous parameters associated with it, and offering that everyone’s body is different, however, and that no specific nutrition plan works exactly the same for everyone. Although proper nutrition is extremely important, so is functional fitness and movement, particularly to avoid injury caused by improper loading,

over-correcting, or compensating because of poor mobility (Healy, 2014). He continues to explain how sports therapy can help correct or identify imbalances and poor movement patterns, and how functional fitness helps to ensure the entire body is involved in athletic development rather than isolating muscles by use of machine or other outdated training programs. His example is a leg-press machine not developing all the muscles in the body, in the same fashion a squat would. Healy believes that sports therapy, along with functional fitness and movement, falls within a “preventative” category to prevent injury while training.

Researchers asked Healy about age being a factor for training, specifically for upper-body strength training for females. With this question, Healy believed ages could effectively be grouped into 17–27, 27–38, and 37–50, and noted that after a certain point (around age 27), building significant muscle potential becomes limited, particularly for those people who start exercising later in life. Healy used a term researchers were not familiar with, called “training age.” In essence, training age is the number of years a person has been training. It does not always coincide with a person’s age or experience around physical fitness, and can vary depending on a person’s training experience. He used an example of two men training, one 50 years of age who has played a variety of physical and team sports since the age of 13. Compare this person with someone who is 28 years old, who just started weight training and running two years ago. The 50-year old has a training age of 37, and the 28-year old has a training age of two. The latter person, he stated, will likely have significant deficiencies compared with the one who has trained at a higher level for most of his life. To put this into further perspective:

If someone has been highly involved with sports since their younger years, and they continue significant training over their lifetime, their central nervous system will be much more in tune and adapted for exercise compared to an individual that has never had any sort of routine training and is not experienced with this regimen. (Healy, 2014)

In essence, “training age” is equally important as physical age, and on average, more likely to be a better predictor of training success for physical fitness programs with a specific goal.

Researchers asked Healy if “training age” was an overall general outlook on being physically fit, or if individuals might have different training ages for different sports or muscle groups, with pull-ups for females as an example. Effectively speaking, Healy stated that muscle memory is significant when calculating training age, and calculations are difficult, particularly when trying to determine a starting point for strength building and or training. According to Healy:

Once the central nervous system has adapted to training at a high level of fitness, it will be “easier” to adapt once again. That said, it’s also muscle dependent, therefore a cross-country runner in high school, college and thereafter might have a younger training age when it comes to upper-body weight training to learn how to do pull-ups. It just depends. (Healy, 2014)

In essence, he stated once again that the central nervous system’s ability to adapt to the workout load would be different depending on the history of training and muscle memory.

Lastly, Healy was asked for his thoughts on the training program provided to all female Marines to assist them in building their upper-body strength. His initial response was, “I don’t necessarily see anything wrong with it; it’s just that the variables are enormous. The biggest hole I see is wherever it says max, even on weighted push-ups, there is no range” (Healy, 2014). He also mentioned that working with machines is not ideal unless it is for rehab purposes, particularly for seniors, used to ensure clients do not fall-out of position and hurt themselves. Machines do not always match body style, even when manipulating the structure itself; they have a very specific track and rarely should they be assigned to accommodate different individuals; and they are typically designed for the average individual. For training, he stated, free-weights are the way to go, and for pull-ups, body weight will be a significant factor:

Someone who has gained 25 pounds in their career may be able to continue meeting the run requirement, but pull-ups will be significantly harder. If you start training *after* the 25 pounds have been added, especially for pressing and pulling exercises, it will be fewer reps, equally less conditioning, and more assistance in order to get the number of repetitions needed for success. (Healy, 2014)

He also stated some of the repetitions expected and the weights prescribed confused him. At the end of the day, he said, it is all about volume. He would recommend prescribing at least a minimum repetition number and working forward from there with a hierarchy of “jumping pull-ups,” “banded pull-ups,” “negatives,” and finally, “body weight” pull-ups:

Once a person can complete 20 jumping pull-ups, the next step is banded pull-ups. Do at least 12 banded pull-ups before moving forward to 5 repetitions of 5-count negatives, only then would I recommend a person move to body-weight pull-ups. There are a million publications out there on starting pull-ups. A good one that I recently came across is in a publication called “BoxLife.” It’s their Feb/March 2014 edition. (Healy, 2014)

Overall, the discussion revealed the numerous factors involved with training a person, any person, to a general standard. In fact, aside from the specific question regarding his general fitness levels being male or female, he never once brought gender into the equation. The discussion itself surrounded important facets of being physically fit and how controlling for them was more important than gender.

3. Interview Conclusions

Both trainers believe that building upper-body strength does not necessarily differentiate as much by gender as it does by overall fitness level starting out and the multifaceted composition of being healthy. In short, input was a clear tell-tale of what the level of expected output should be; and “input” is defined by the total person beginning the exercises, age, nutritional health, occupational health (includes injuries), “training age,” correct movement and load bearing, correct programming of training programs, and, of course, the effort put forth.

VI. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter attempts to connect the dots by bringing together varied sources of information collected and evaluated during the course of the study. It summarizes the main points of previous chapters, draws conclusions from statistical analysis, and offers recommendations from knowledge gleaned throughout the research.

A. SUMMARY

On November 27, 2012, the commandant of the Marine Corps released an ALMAR message directing a change to the PFT for female Marines. The message states, effective January 1, 2014, pull-ups replace the flexed-arm hang. As it turned out, implementation of the pull-ups requirement was officially postponed in a message to Marines on January 24, 2014, and delayed through June 30, 2014. This essentially has postponed implementation until at least January 2015.

As observed in the introduction to the thesis, the present study is intended to be “fact-finding” and exploratory, seeking to look broadly at the overall policy change, how some Marines perceive the new PFT requirement, and whether the change may have certain unintended consequences. This thesis attempts to fill some of these informational gaps by examining societal factors and trends, and by polling the views and experiences of Marines within the ERR to determine how they are adjusting to the policy change. Further, the study seeks to ascertain if any second- or third-order effects might be mitigated by updates to the policy, providing all Marines with a better environment in which to thrive and be successful.

1. Literature Review

To better understand the background, setting, and potential implications of the PFT policy change, publications and related documents were collected,

reviewed, and organized by seven areas: Marine Corps studies and reviews, Marine Corps actions to shift from a Biannual PFT to a Semiannual PFT/CFT, orders and manuals, DOD instructions and actions, reports to Congress, Presidential-level fitness initiatives, and fitness requirements for firefighters.

The literature review as a whole suggests that society's norms have slowly evolved away from traditional, gender-specific requirements and expectations toward developing gender-free standards based on validated outcomes or job requirements. The movement toward gender-free standards can be identified in a variety of applications and levels, from Presidential Youth Fitness programs to fitness requirements for firefighters. Additionally, actions in Congress and DOD continue to establish standards that emphasize both inclusiveness and fairness, regardless of gender, across the military services. These indicators suggest an increasing awareness of the costs and benefits of gender-neutral physical standards as well as the need to base them on realistic, empirically validated occupational or task requirements.

All of the Marine-related papers and studies reviewed for the study recognize that a significant training gap has existed between male and female Marines for many years. Nevertheless, previous research indicates that if given the right resources, female Marines can gain the upper-body strength necessary to pass the new PFT requirement. At the same time, previous research and societal trends suggest that the shift to a new standard may have significant unintended consequences. For historical reference, the Marine Corps shift from a biannual PFT to a semiannual PFT/CFT was preceded by a comprehensive review of associated issues as well as a well-planned period for introducing the change. The degree of planning and evaluation for the present PFT policy change was far less, even though the implications for females, serving now or potentially in the future, could be quite significant. Given the longstanding training gap between males and females in the Marine Corps, and throughout the entire American population, the new policy could affect the recruiting, retention, or careers of female Marines. Further, female Marines currently serving, particularly

those well into their career, may not be comfortable with the pace and preparation for the policy change.

2. Survey of Marines in the Eastern Recruiting Region (ERR)

A structured, online survey was administered to Recruiters, Drill Instructors, and Permanent Personnel within the ERR. At the time of the survey, this included 3,986 Marines, with approximately 3,600 male Marines and 386 female Marines. A total of 457 responses were received. This represents a response rate of 11.5 percent. Of the 457 surveys returned, 372 (81.4 percent) were fully completed. A demographic analysis of survey respondents shows that female Marines are represented at about twice the rate (20.4 percent) as in the ERR target population (9.7 percent). Given the nature of the topic and direct impact of the policy change for female Marines, it is reasonable to assume that females believed they had more to gain from completing the survey than did their male counterparts.

A total of 180 respondents—nearly *half* of all respondents with a completed survey—submitted a personal comment. This number is surprisingly high, and suggests substantial interest by these respondents in the shift to pull-ups. These comments are also useful in identifying and understanding areas that are considered most important by respondents when discussing the policy change.

The survey combines dichotomous questions, rank-order scaling, demographic questions, and one open-ended question at the end to solicit comments from respondents. Since this survey was believed to be the first sent exclusively to ERR to address the PFT policy change, it was designed primarily as an exploratory effort in the hope of gaining some sense of how the new requirement could affect recruiting and retention. Additionally, the survey was designed to gauge the experiences of female Marines in preparing for the policy change as well as their views regarding physical training programs to improve upper-body strength.

Survey results show the following.

- Overall, Marines who participated in the survey had mixed feelings toward the PFT policy change for both themselves and for their fellow Marines.
- A majority of respondents felt that the PFT change would create closer equality between the sexes. At the same time, most respondents stated that the new policy has not really “improved their view toward females.”
- Over 60 percent of respondents felt that the PFT change could have an adverse effect on female Marines’ promotability; conversely, about 40 percent felt it could have a positive influence on the promotability of female Marines.
- Most respondents do not think the PFT change will affect the promotability of male Marines, either positively or negatively.
- Two out of three respondents felt that pull-ups are a better measure than the flexed-arm hang of upper-body strength required for a Marine combat deployment.
- Overall, survey respondents were split over whether female Marines closer to retirement should be “grandfathered”; however, female respondents were more favorable toward the idea than were their male counterparts.
- Most respondents, male or female, do not think the policy change has “broken faith” with female Marines.
- ERR respondents strongly believe (70 percent) that the policy change will make it more difficult to recruit females. This feeling is even greater (83.4 percent) among Marines who have recruiting experience.
- ERR respondents also feel strongly (59.4 percent) that the PFT change will cause more recruits to “attrite” from boot camp. This opinion is even stronger among former or current drill instructors (71.2 percent) as well as non-drill instructors (72.5 percent) when respondents who stated “neutral” are removed from the base population.
- Apparently, about one-half of the female respondents couldn’t do a single pull-up on the date the policy change was announced.
- A relatively small proportion of respondents (less than 10 percent) used the training tool on the TECOM website to increase their number of pull-ups, and less than half of these Marines claimed that the regimen had helped them. At the same time, over two-thirds (67.8 percent) said that they had used a different training

regimen, and three-quarters of these said that the different training regimen helped them to increase their pull-ups. About 11 percent of respondents admitted to paying out-of-pocket for a training program.

- Roughly one-third (34.6 percent) of the respondents felt they had command support. Conversely, 26.9 percent felt otherwise or could neither agree nor disagree (29.3 percent).

A content analysis of the comments submitted by 180 respondents allowed these comments to be placed into four general categories. (Note that some double-counting occurs.) Interestingly, half of the comments (90) supported the policy change, while somewhat fewer (61) questioned it. Just under half (84) raised an equity concern. A smaller number (20) said that they are (or know others) struggling to pass the new PFT standard.

3. Interviews with Expert Trainers

Expert trainers interviewed for the study indicate that a woman's physiological composition does not necessarily prevent them from increasing upper-body strength to accomplish pull-ups; yet, a host of other factors might work against them. Specifically, the right tools for pull-up training need to match the correct type, level, and frequency of a person's input. This input includes nutritional health, occupational health, and training age that matches the programming of a training regimen. With functional movement techniques for support and weight-distributed load bearing for injury prevention, training programs can prove successful in bringing most Marines, female or male, to a training standard deemed combat-ready.

B. CONCLUSIONS

Two general themes emerge from the study. These themes are discussed below, followed by two recommendations for further study.

- Theme 1: The Marine Corps is following a widely accepted trend by moving toward a single physical fitness test for Marines, regardless of gender. However, do the unintended, longer-term consequences outweigh the immediate benefits?

In 1992, the Presidential Youth Fitness Program was changed to measure upper-body strength in both boys and girls by ability, without discriminating by event. The Bureau of Land Management’s (BLM’s) “National Fire Operations Fitness Challenge” is also gender-neutral, as their challenge is designed to test firefighters’ agility and strength in real-life situations. The physical fitness test is formulated on the basis of occupationally- specific duties and a person’s ability to complete them. By following congressional direction and DOD policies to make physical standards commensurate with job-related skills (Chapter II), the Marine Corps continues to take steps toward creating a “gender-equal playing field.”

The genesis of the female PFT policy change links a stronger female, with increased upper-body strength, to infantry battalions, thus supporting the commandant of the Marine Corps’ exception to policy for manning and staffing. When tied directly to that staffing exception, slowly integrating a stronger female into an infantry unit makes perfect sense. It also appears to create improved gender-equality, as claimed by a majority of respondents on the ERR survey.

On the surface, this change seems positive, since it appears to break down significant gender barriers by establishing a more universal standard. However, when over two out of five survey respondents disagree that their view toward female Marines in the Marine Corps has improved due to the policy change—and nearly half of respondents who provided personal comments claim that the PFT change actually *raises* equity concerns—one must ask whether the new policy is helping to bridge the gender gap or widening the divide, at least in the eyes of those most affected. Perhaps additional steps may be needed to achieve the desired objective and promote cultural change in a more positive way.

Previous research suggests that training programs to increase upper-body strength published by HQMC for all female Marines (USMC female PFT, n.d.) and the one by HQMC that was implemented at Parris Island for recruits, are insufficient (CNA, 2014). These concerns are echoed by survey respondents, who apparently used the programs in very low numbers and found other training

opportunities far more effective. These concerns also emerge in the personal comments submitted by respondents, with many believing the policy change is a “force-shaper,” or an effort by senior leaders to only keep a certain type of Marine in the future Corps. These comments, although not necessarily representative of the larger Marine population, are worrisome, nevertheless, since they raise doubts that the policy change is achieving its intended objective. Indeed, further efforts may be needed to communicate to both male and female Marines the true intention of the PFT change.

As the professional trainers stated during interviews, outputs are managed by inputs and the training provided to succeed. Start beginners at a beginner’s level, start intermediates at an intermediate level, and so on. Instead of being gender-specific, training should be ability-driven and based on myriad aspects of a person’s existing state of physical fitness.

- Theme 2: Change that occurs too quickly can damage an organization and its ability to achieve optimal effectiveness.

The survey results, taken as a whole, suggest that the PFT change will require additional mental and physical preparation by female Marines to support a more positive outlook for successful organizational change. With the population of females in the entire Marine Corps being just 7.4 percent, and the targeted population of females in ERR being slightly higher at 9.7 percent, it was somewhat surprising to find such a disproportionately high percentage of females (over 20 percent) responding to survey. Certainly, female Marines have a greater personal stake in the PFT change than do male Marines, and thus, would be expected to have a greater interest in expressing their views on the survey. Yet, the level of interest, when compared with their male counterparts, was unexpectedly high. Moreover, the real question may not be why proportionately more female Marines participated in the survey, but why proportionately more male Marines did not. The reasons for these differences in survey participation by gender are unclear, but may indicate differing levels of buy-in, understanding, or interest in the PFT change across the gender divide.

The survey comments show that some Marines (both male and female) think the change occurred too quickly. Among the reasons, many express a concern that the training tools available to Marines are inadequate. This statement is supported by survey data, where four out of five respondents did not use the online training tool published on the TECOM website; and, of the 9.6 percent who did, only about half felt the online tool helped them increase their pull-ups. The view is further supported by a CNA (2012) study, which found that only 33.3 percent of females trained using the “PT Playbook” could complete three pull-ups at their final PFT of boot camp. In addition, as noted above, just about one-third of survey respondents felt they were getting command support to train for increasing their pull-ups. Although respondents were not asked about injury rates, at least one respondent commented that her training was stopped due to injury. Injuries are likely occurring, but at an undetermined rate.

Acceptance of the PFT change might have been better received as equitable if female standards were not changed to male standards, but, rather, if both standards were modified in some way to achieve the “best-available” measurement of upper-body strength. According to the Pull-up Study (McGuire, 2014), the flexed-arm hang was deemed by the 2010 Sergeant Major Symposium as an ineffective test of upper-body strength. Respondents to the survey might not agree that the flexed-arm hang is generally ineffective as a test of upper-body strength, although two-thirds did feel that “pull-ups are a better measure than flexed-arm hang of upper-body strength required for a Marine combat deployment.” It is noteworthy that roughly 80 percent of Marines who answered the question on their number of combat deployments had experienced at least one such deployment, and almost one-quarter of these had as many as three or four deployments. Consequently, it is assumed that the sample of respondents is relatively knowledgeable regarding the demands of a combat deployment. Accepting that females should increase their upper-body strength, or accepting that pull-ups are a better measure than flexed-arm hang, doesn’t appear to be a major point of disagreement among these respondents.

Nevertheless, the survey does reveal a strong undercurrent of opinion that the policy change might have longer-term repercussions, including an adverse impact on the promotability, recruitability, and retainability of female Marines. One can only speculate as to whether the relatively low opinion of Marine Corps-provided tools to improve upper-body strength, or only one-third of respondents feel they are getting command support might eventually affect morale, opinions of Marine leadership, or views regarding the timing, pace, and need for this particular policy change.

Of the 180 comments received from the survey, at least half appear to support the policy change itself, with almost half still raising equity concerns. This is yet another possible indicator that some Marines are struggling to fully “buy in” to the policy change. The less-positive comments cite a variety of reasons for feeling concerned about the change, including inadequate training tools for bringing females up to standard, disbelief in pull-ups being the “best available” measure of upper-body strength for both males and females, scoring “double standards,” and issues relating to physiological differences.

A significant training gap has existed between male and female Marines for many years. These gender differences have cultural and historical roots, and have continued for so long that a simple upper-body training plan is not sufficient to bridge the gap needed to change the hearts, minds, and resilience of female Marines having served years of their lives in the Corps. Marines follow orders, and they will continue to do so. Nonetheless, planning and executing a significant policy change linked to “old-school” societal norms are far more challenging than changing a single event on a fitness test. Some Marines, male and female alike, believe that sheer determination and a simple physical training plan can put success on the horizon. Other Marines, according to comments from the survey, claim that females are struggling to maintain the minimum standard, be it lack of strength, lack of belief in themselves, lack of training, or even injury.

C. RECOMMENDATIONS

Further research on a broader scale is needed to study the PFT policy change. Comments provided by Marines on the ERR survey offer a glimpse into the raw emotions felt by real people struggling with a problem that can affect their career or that of a peer, the entire Marine Corps, and possibly the course of their life.

Further research can identify successful training plans, better understand injury trends, and propose minor updates to a policy that will ultimately change the Corps for the better. Two recommendations are offered.

- Expand the survey sample size to determine how Marines are dealing with the cultural change

When given the opportunity to provide comments, nearly half of all respondents submitted personal accounts, in-depth discussion points, and recommendations for further change to the policy. Their recommendations went far beyond the scope of this thesis, although not beyond the scope of recommending change to their organization. With an increased sample size and a broader scope of questions, Marines can be offered an opportunity to express their views on training effectiveness and possible ways to support cultural change. In this way, leaders can receive personal commentary from Marines hoping to change their Corps for the better.

- Create testing transparency to improve the upper-body strength for all Marines

A general level of fitness can be achieved by both genders with proper training, time, and management of input factors to optimize output. A call to improve upper-body strength, if that is what combat requires, should be consistent across the Marine Corps. Treating Marines fairly, without regard to gender, will foster more effective enterprise-valued training and teamwork, which leads to a more successful organization.

APPENDIX A. SURVEY

Evaluation of the policy change for female Marines performing a flexed-arm hang to performing pull-ups in the Marine Corps Physical Fitness Test (PFT)

You are invited to participate in a study entitled: "Evaluation of the Policy Change for Female Marines from Performing a Flexed-arm Hang to Pull-ups in the Marine Corps Physical Fitness Test (PFT)." The study examines Marines' attitudes toward the change and its potential effect on the force.

Procedures. This survey should take approximately 5-10 minutes to complete. You are authorized to take this survey during duty hours.

Voluntary Nature of the Study. Your participation is strictly voluntary. If you choose to participate you can change your mind at any time and withdraw from the survey. You will not be penalized in any way or lose any benefits to which you would otherwise be entitled if you choose not to participate in this study or to withdraw. The alternative to participating in the survey, is to not participate.

Potential Risks and Discomforts. The potential risks of participating in this study are minimal. LimeSurvey has been used at the Naval Postgraduate School (NPS) as a proven survey tool with no known breeches of confidentiality. The survey will be administered in accordance with all NPS rules and regulations, and with Marine Corps Recruiting Command (MCRC) and Eastern Recruiting Region (ERR) Command approval.

Anticipated Benefits. The results should provide the Department of Defense and the Marine Corps with current information on Marines' perceptions regarding the policy change for female Marines from performing the flexed-arm hang to performing pull-ups in the Marine PFT. You will not benefit directly from your participation in this research.

Compensation for Participation. No tangible compensation will be given.

Confidentiality & Privacy Act. Any information that is obtained during this study will be kept confidential to the full extent permitted by law. All efforts, within reason, will be made to keep your personal information in your research record confidential but total confidentiality cannot be guaranteed. The storage and access of all information received for this study will be maintained by the primary researchers and saved on the secure NPS server.

Points of Contact. If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you

experience while taking part in this study, please contact the Principal Investigator, Dr. Mark Eitelberg, (831) 656-3160, meitelberg@nps.edu. Questions about your rights as a research subject or any other concerns may be addressed to the Naval Postgraduate School IRB Chair, Dr. Lawrence Shattuck, (831) 656-2473, lgshattu@nps.edu.

There are 32 questions in this survey

Consent

1. I have read the "Consent to Participate" and understand the content of this survey: *

Please choose **only one** of the following:

- Yes
- No

Policy

2. The Physical Fitness Test (PFT) policy change for females from flexed-arm hang to pull-ups creates closer equality between the sexes in the Marine Corps. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

3. The PFT change for females from flexed-arm hang to pull-ups has generally improved my view toward females I know in the Marine Corps. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

4. The PFT change for females could affect *female* Marines' promotability *adversely*. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

5. The PFT change for females could affect *female* Marines' promotability *positively*. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

6. The PFT change for females could affect *male* Marines' promotability *adversely*. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

7. The PFT change for females could affect *male* Marines' promotability *positively*. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

8. Pull-ups are a better measure than flexed-arm hang of the upper-body strength required for a Marine combat deployment. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

9. The PFT policy change for females should waive the requirement or "grandfather" females closer to retirement. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

10. The Marine Corps has "broken faith" with their female Marines by changing the PFT policy. (You can submit comments at the end of this survey.) *

Please choose only one of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

11. This PFT policy change for females will affect how long I plan to stay in the Marine Corps. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

12. This PFT policy change for females will make it more *difficult* for recruiters to enlist females into the Marine Corps. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

13. This PFT policy change for females will make it *easier* for recruiters to enlist females into the Marine Corps. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

14. This PFT policy change for females will cause *more* recruits to be discharged or "attrite" from Marine Corps boot camp. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

15. This PFT policy change for females will cause *fewer* recruits to be discharged or "attrite" from Marine Corps boot camp. *

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

Training

16. Prior to 27 November 2012, about how many pull-up repetitions could you do at one time? (Pull-ups are defined by MCO 6100.13 with Change 1, dated 1 Aug 08.) *

Please choose **only one** of the following:

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21 or more

I decline to answer this question.

17. Have you trained to do pull-ups using the Training and Education Command (TECOM) website <https://fitness.usmc.mil/FPFT/default.aspx>?

(Either trained to increase your pull-ups or trained to begin doing pull-ups.) *

Please choose **only one** of the following:

- Yes
- No

I decline to answer this question.

18. If you have used the TECOM website, did this training package help you increase your number of pull-ups? *

Please choose **only one** of the following:

- Yes
- No
- Not Applicable (Did Not Use Site)
- I decline to answer this question.

19. If you have used the TECOM website, how long did you train to increase your number of pull-ups? *

Please choose **only one** of the following:

- Less than 1 month
- 1-2 months
- 3-4 months
- 5-6 months
- More than 6 months
- Not Applicable (Did Not Use Site)
- I decline to answer this question.

20. I had (have) command support to extend my PT time weekly to train for pull-ups. (*This question refers to the amount of time you are (have been) allotted to PT during working hours.*)*

Please choose **only one** of the following:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree
- I decline to answer this question.

21. Have you trained to do pull-ups using a different regimen than posted on the TECOM website? *

Please choose **only one** of the following:

- Yes
- No
- I used a combination of the TECOM website and another training regimen
- I decline to answer this question.

22. If you used a different training regimen than the TECOM website (even if you supplemented), did it help you increase your number of pull-ups? *

Please choose **only one** of the following:

- Yes
- No
- Not applicable (Did not use different regimen.)
- I decline to answer this question.

23. If you used a different training regimen than the TECOM website, did you pay out-of-pocket for this training? *

Please choose **only one** of the following:

- No, I did not use another training regimen.
- Yes, I used another training regimen, but it did not cost me any out-of-pocket expenses.
- Yes, I used another training regimen, and it cost me between \$1-\$50 per month out-of-pocket expenses.
- Yes, I used another training regimen, and it cost me between \$51-\$100 per month out-of-pocket expenses.
- Yes, I used another training regimen, and it cost me between \$101-\$150 per month out-of-pocket expenses.
- Yes, I used another training regimen, and it cost me between \$151-\$200 per month out-of-pocket expenses.
- Yes, I used another training regimen, and it cost me more than \$200 per month in out-of-pocket expenses.
- I decline to answer this question

Demographics: Questions in this section will be used for analysis by group, NOT for identification purposes.

24. I am (gender) *

Please choose **only one** of the following:

- Male
- Female
- I decline to answer this question.

25. How long have you been in the Marine Corps? *

Please choose **only one** of the following:

- 1-3 years
- 4-8 years
- 9-12 years
- 13-15 years
- 16-19 years
- 20-25 years
- 26 years or more
- I decline to answer this question.

26. My grade in the Marine Corps is: *

Please choose **only one** of the following:

- E1
- E2
- E3
- E4
- E5
- E6
- E7
- E8
- E9
- W1
- CWO2
- CWO3
- CWO4
- CWO5
- O1
- O2
- O3
- O4
- O5
- O6
- O7
- O8

I decline to answer this question.

27. I am (status): *

Please choose **only one** of the following:

- Active
- Reserve
- I decline to answer this question.

28. My primary MOS in the Marine Corps is: *

Please choose **only one** of the following:

- 01XX
- 02XX
- 03XX
- 04XX
- 05XX
- 06XX
- 08XX
- 09XX
- 11XX
- 13XX
- 18XX
- 21XX

- 23XX
- 26XX
- 27XX
- 28XX
- 30XX
- 31XX
- 33XX
- 34XX
- 35XX
- 41XX
- 43XX
- 44XX
- 46XX
- 48XX
- 55XX
- 57XX
- 58XX
- 59XX
- 60XX
- 61XX
- 62XX
- 63XX
- 64XX
- 65XX
- 66XX
- 68XX
- 70XX
- 72XX
- 73XX
- 75XX
- 8XXX
- Other
- I decline to answer this question.

29. How many combat deployments have you had? *

Please choose **only one** of the following:

- None
- One
- Two
- Three
- Four or more
- I decline to answer this question.

30. Have you ever served as a Recruiter? *

Please choose **only one** of the following:

- Yes
- No
- I decline to answer this question.

31. Have you ever served as a Drill Instructor? *

Please choose only one of the following:

- Yes
- No
- I decline to answer this question.

Comments

33. PLEASE FEEL FREE TO SHARE ANY COMMENTS BELOW:

Please write your answer here:

Thank you for completing this survey! We sincerely appreciate your time and input.

02-14-2014
23:59

Submit your survey.
Thank you for completing this survey.

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APPENDIX B. EMAIL INVITATION TO PARTICIPATE

Subj: Evaluation of the Policy Change for Female Marines performing a Flexed-arm Hang to Performing Pull-ups in the Marine Corps Physical Fitness Test (PFT)

Fellow Marines,

I am a student at the Naval Postgraduate School studying the policy change listed above. For thesis research, I am administering a survey that evaluates the change for females from performing a flexed-arm hang to pull-ups in the Marine Corps Physical Fitness Test (PFT) as my thesis topic in the Graduate School of Business and Public Policy (GSBPP) at the Naval Postgraduate School (NPS). This survey will provide real Marines' perceptions as data for my study, and will provide the Department of Defense and the Marine Corps with current information of male and female Marines' perceptions of the change, as well as their real experiences in training to increase their ability to do pull-ups.

PLEASE HELP OUR EFFORTS BY TAKING ROUGHLY 5-10 MINUTES OUT OF YOUR DAY TO COMPLETE THIS SURVEY.

Participation:

Your participation is completely voluntary. It will assist us in identifying trends in Marines' perceptions since the policy change was announced on 27 November 2012.

How to participate:

Your responses to the survey questions are entirely anonymous. LimeSurvey does not actively inspect or monitor customer's individual survey questions or responses nor do they sell the data collected or the email collector lists for marketing purposes. This survey should take roughly 5-10 minutes to complete and is available online through the "LimeSurvey" link below.

CLICK THE LINK BELOW to begin taking the survey.

<https://survey.nps.edu/535469/lang-en>

NOTICE: PLEASE select the response CLOSEST to your views to ensure that the survey is filled out completely. Thanks again for your time and help!

If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you experience while taking part in this study, please contact the Principal Investigator, Professor Mark Eitelberg at, meitelberg@nps.edu. Questions about your rights as a research

subject or any other concerns may be addressed to the Naval Postgraduate School IRB Chair, Dr. Lawrence Shattuck, at lgshattu@nps.edu.

APPENDIX C. FIRST SURVEY REMINDER EMAIL

Subj: Evaluation of the Policy Change for Female Marines performing a Flexed-arm Hang to Performing Pull-ups in the Marine Corps Physical Fitness Test (PFT)

Fellow Marines,

This is just a reminder that our survey will only be available for one more week. I ask that you take the anonymous survey to assist in a study that will assist the Department of Defense and the Marine Corps with current information of male and female Marines' perceptions of the change, as well as their real experiences in training to increase their ability to do pull-ups. I have received some feedback that the survey actually only takes about 5-minutes.

CLICK ON THE LINK BELOW to begin taking the survey.

<https://survey.nps.edu/535469/lang-en>

Taking this survey is voluntary. Thank you to those who have already taken the survey and we look forward to seeing the survey responses from some who have not.

If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you experience while taking part in this study, please contact the Principal Investigator, Professor Mark Eitelberg at, meitelberg@nps.edu. Questions about your rights as a research subject or any other concerns may be addressed to the Naval Postgraduate School IRB Chair, Dr. Lawrence Shattuck, at lgshattu@nps.edu.

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APPENDIX D. SECOND SURVEY REMINDER EMAIL

Subj: Evaluation of the Policy Change for Female Marines performing a Flexed-arm Hang to Performing Pull-ups in the Marine Corps Physical Fitness Test (PFT)

Fellow Marines,

Our Female PFT change survey will close this February 14, 2014.

Taking this survey is voluntary. Thank you to those that have already participated. Your support is greatly appreciated.

For those of you, who have yet to take the survey, please consider this by clicking on the attached link. It should take no more than about 10 minutes.

<https://survey.nps.edu/535469/lang-en>

The original email is attached for your reference.

If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you experience while taking part in this study, please contact the Principal Investigator, Professor Mark Eitelberg at, meitelberg@nps.edu. Questions about your rights as a research subject or any other concerns may be addressed to the Naval Postgraduate School IRB Chair, Dr. Lawrence Shattuck, at lgshattu@nps.edu.

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APPENDIX E. INTERVIEW CONSENT FORM

Naval Postgraduate School Consent to Participate in Research

Introduction. You are invited to participate in a research study entitled "Analysis of the pull-ups requirement in the U.S. Marine Corps Physical Fitness Test for Females. The purpose of the research is to analyze how well the Marine Corps prepared for and executed this policy change in terms of expectations and preparing female Marines for success, as well as anticipating second and third-order effects of the policy change within the Eastern Recruiting Region.

Procedures. Participation will include;

- A review of a training program published by Training and Education Command, Headquarters Marine Corps by <interviewee>, Owner/Coach at Systematic Strength Gym and Personal Training Studio of Pacific Grove, CA.
- No more than a 60-minute face-to face interview (or email if you prefer).
- There are no experimental procedures.
- The interview will not be recorded however, with your permission, direct quotes to be used during research.

Location. The interview/survey/experiment will take place at the Systematic Strength Gym located at the American Tin Cannery in Pacific Grove, CA unless you prefer to answer the questions via email interview.

Cost. There is no cost to participate in this research study.

Voluntary Nature of the Study. Your participation in this study is strictly voluntary. If you choose to participate you can change your mind at any time and withdraw from the study. You will not be penalized in any way or lose any benefits to which you would otherwise be entitled if you choose not to participate in this study or to withdraw. The alternative to participating in the research is to not participate in the research.

Potential Risks and Discomforts. The potential risks of participating in this study are minimal as your name and point of contact information will be collected for quoting. All quotes will be verified prior to the completion of the interview and kept within the context of the research topic. Only professional opinions will be requested directly relating to the research analysis.

Anticipated Benefits. Anticipated benefits from this study are expert testimony and observation into increasing upper body strength and total fitness of all Marines. The results of this research should provide the Department of Defense and the Marine Corps with an external review and recommendation for increasing upper body strength for all Marines. You will not directly benefit from your participation in this research.

Compensation for Participation. No tangible compensation will be given.

Confidentiality & Privacy Act. Any information that is obtained during this study will be kept confidential to the full extent permitted by law. All efforts, within reason, will be made to keep your personal information in your research record confidential but total confidentiality cannot be guaranteed. The storage and access of all information received for this study will be maintained by the primary researchers and saved on the secure NPS server.

If you consent to be identified by name in this study, any reference to or quote by you will be published in the final research finding only after your review and approval. If you do not agree, then you will be identified broadly by discipline and/or rank, (for example, "fire chief").

I consent to be identified by name in this research study.

I do not consent to be identified by name in this research study.

Points of Contact. If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you experience while taking part in this study please contact the Principal Investigator, Dr. Mark Eitelberg, (831) 656-3160, meitelberg@nps.edu. Questions about your rights as a research subject or any other concerns may be addressed to the Navy Postgraduate School IRB Chair, Dr. Larry Shattuck, 831-656-2473, lgshattu@nps.edu.

Statement of Consent. I have read the information provided above. I have been given the opportunity to ask questions and all the questions have been answered to my satisfaction. I have been provided a copy of this form for my records and I agree to participate in this study. I understand that by agreeing to participate in this research and signing this form, I do not waive any of my legal rights.

Participant's Signature

Date

Researcher's Signature

Date

APPENDIX F. REQUEST TO RECRUIT (INTERVIEW) EMAIL

Subject: Request for an interview

Gentlemen, I am a student at the Naval Postgraduate School attending the Graduate School of Business and Public Policy (GSBPP). My thesis topic is to analyze the pull-ups requirement in the U.S. Marine Corps Physical Fitness test for females. For my thesis research, I'm requesting to interview you both about this topic. I'm asking to interview you because of your expertise in physical fitness and coaching and your backgrounds in owning and operating your own gym and your individual certifications and education. I believe you are both duty experts in your field and believe your insight will provide valuable input for my analysis and potential future changes and/or to more effectively train Marines to increase upper body strength. Although my thesis focuses on females and upper body strength, I ask you remain objective during our discussion to include abilities of both men and women in reaching a higher athletic potential.

Participation:

Your participation is completely voluntary. It will assist us in analyzing more objectively the upper body strength and abilities of both men and women; particularly since the policy change became effective on November 27, 2012.

How to participate:

I have included a list of topics we will discuss during the interview. Although I prefer to discuss in person, I understand your time is valuable and email might be a more efficient mode of communication. If given the opportunity to discuss in person, I do not anticipate taking more than 60-minutes of your time, barring your questions or additional input from follow-on questions.

If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you experience while taking part in this study, please contact the Principal Investigator, Professor Mark Eitelberg at, meitelberg@nps.edu. Questions about your rights as a research subject or any other concerns may be addressed to the Naval Postgraduate School IRB Chair, Dr. Lawrence Shattuck, at lgshattu@nps.edu.

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APPENDIX G. LIST OF QUESTIONS-INTERVIEWEE #1

I have read your biography on the Systematic Strength website, but would like a little more background on you, your philosophy on fitness and how you might define being “physically fit.”

1. I know you also have a thriving private sports therapy practice that you started even before opening a Crossfit affiliate gym in PG. How might your sports therapy practice influence your perspective on being physically fit?
2. How long would you say you've been fitness coaching?
3. Your bio also mentions that you are a CrossFit Olympic Weightlifting Certified Instructor. I'm interested to learn more about that from a male/female perspective and the different requirements, goals or achievements by sex.
 - a. Do you know where I might find the different qualifying weights for a variety of upper body lifts (ex; push press, ground to over-heads, etc.)
 - b. Is there a difference between male and female training on these exercises/skills?
 - c. What is your experience in working with males and/or females with upper body strength?
 - d. With your experience, do you believe pull-ups is a “good” measurement of upper body strength for males and females? If not, is there a better one you might recommend?
4. I know the Crossfit prescribes different weights for their workouts for men and women. Why do you believe they do this?
5. Have you ever come across a Crossfit event, a workout or an exercise that might be prescribed for men, but not for women? (or vice versa)
The Marine Corps expects every Marine to be physically fit, regardless of age, grade or duty assignment. We have publications (Orders) that emphasize the requirement for all Marines to adopt a healthy lifestyle and lifelong commitment to fitness, believing this combination has a direct and positive impact on job performance and combat readiness.
The Marine Corps Fitness Program dictates that commanders are responsible for the development, implementation and management of organizational physical training. The program also dictates that Marines will perform at least five combat conditioning sessions, of 30 minutes duration, per week. Combat conditioning sessions are defined as aerobic and muscle-strengthening activities. They dictate that strength training consisting of compound functional movements should be done at least twice a week, in combination with or separate from cardiorespiratory exercise.

The Marine Corps measures the fitness of their personnel by administering 2 tests per year. The Physical Fitness Test (PFT) is completed between Jan-Jun annually and the Combat Fitness Test (CFT) is completed July-December annually. Marines are required to pass each of these tests every year, barring temporary physical limitations due to injury, disease, underlying medical conditions, etc. Our further discussion today will focus on the PFT. The PFT is a collective measure of general fitness Marine Corps wide. It was specifically designed to test the strength and stamina of the upper body, midsection, and lower body, as well as efficiency of the cardiovascular and respiratory systems. There are 3 events for males and females in the PFT. Males are required to complete no less than 3-pull-ups (20 is a perfect score), a timed 3-mile run and as many crunches as possible within a 2-minute period. Females used to be required to complete the flexed arm hang (70 sec for a perfect score), a timed 3-mile run and also as many crunches as possible within a 2-minute period. Last year, the Marine Corps changed the flexed arm hang requirement within their PFT for females, stating that females would now be required to complete pull-ups just like men. The minimum requirement for pull-ups for females is 3, and the maximum (for a perfect score) is 8; citing differences still between males and females. The Marine Corps' Training and Education Command (TECOM) published an online training package to assist females and their commanders change their individual and unit training programs to accommodate. I've provided a copy of that training program, it's TAB A. This training program was published to complement the 5 combat conditioning sessions per week, of at least 30 minutes per session.

Thanks for reviewing the training package I sent to you. It's the Marine Corps Training package for building upper body strength in females to be able to complete at least 3 pull-ups in a 12 week timeframe.

6. Do you believe this training package, if used in combination of the 5 weekly combat conditioning sessions described above, is sufficient for most females to develop enough upper body strength to complete at least 3 pull-ups in a 12 week timeframe? Please elaborate. What factors might contribute to faster/slower success rates? (age, BMI, nutrition, different exercises..etc.)

7. How easy or difficult do you believe developing upper body strength is for men and/or women in different age brackets? (use age brackets 18–21, 22–27, 28–35, 36–42, 42–50 as examples)

Thank you for your time! I truly appreciate your time and input to assist my research efforts for my thesis.

APPENDIX H. LIST OF QUESTIONS-INTERVIEWEE #2

I have read your biography on the Systematic Strength website, but would like a little more background on you, your philosophy on fitness and how you might define being “physically fit.”

1. I know you started with CrossFit in 2004, is that when you began coaching CrossFit? I also read you have a NASM certification. How long have you been fitness coaching overall?
2. In your bio, you mention the number one motivator for wanting to become a CrossFit Instructor/Affiliate Owner is to help others become healthier and more active so they can enjoy life to the fullest. What does that entail and is it different for men and women?
3. How might you define being “physically fit”?
4. Your bio also mentions that you are CrossFit Nutrition Certified. I’m interested to learn more about that from a fitness perspective. I’ve been researching CrossFit, health and fitness for a while now; is it safe to assume that nutrition is the fuel to support overall fitness defined as increased aerobic activity, mobility, flexibility and strength? How important is nutrition to being fit and are there different requirements for men and women when it comes to nutrition? Is nutrition more important than working out when trying to be physically fit?
5. With your experience, do you believe pull-ups is a “good” measurement of upper body strength for males and females? If not, is there a better one you might recommend?
6. I know the CrossFit prescribes different weights for their workouts for men and women. Why do you believe they do this?
7. Have you ever come across a CrossFit event, a workout or an exercise that might be prescribed for men, but not for women? (or vice versa)
The Marine Corps expects every Marine to be physically fit, regardless of age, grade or duty assignment. We have publications (Orders) that emphasize the requirement for all Marines to adopt a healthy lifestyle and lifelong commitment to fitness, believing this combination has a direct and positive impact on job performance and combat readiness.

The Marine Corps Fitness Program dictates that commanders are responsible for the development, implementation and management of organizational physical training. The program also dictates that Marines will perform at least five combat conditioning sessions, of 30 minutes duration, per week. Combat conditioning

sessions are defined as aerobic and muscle-strengthening activities. They dictate that strength training consisting of compound functional movements should be done at least twice a week, in combination with or separate from cardiorespiratory exercise.

The Marine Corps measures the fitness of their personnel by administering 2 tests per year. The Physical Fitness Test (PFT) is completed between Jan-Jun annually and the Combat Fitness Test (CFT) is completed July-December annually. Marines are required to pass each of these tests every year, barring temporary physical limitations due to injury, disease, underlying medical conditions, etc. Our further discussion today will focus on the PFT. The PFT is a collective measure of general fitness Marine Corps wide. It was specifically designed to test the strength and stamina of the upper body, midsection, and lower body, as well as efficiency of the cardiovascular and respiratory systems. There are 3 events for males and females in the PFT. Males are required to complete no less than 3-pull-ups (20 is a perfect score), a timed 3-mile run and as many crunches as possible within a 2-minute period. Females used to be required to complete the flexed arm hang (70 sec for a perfect score), a timed 3-mile run and also as many crunches as possible within a 2-minute period. Last year, the Marine Corps changed the flexed arm hang requirement within their PFT for females, stating that females would now be required to complete pull-ups just like men. The minimum requirement for pull-ups for females is 3, and the maximum (for a perfect score) is 8; citing differences still between males and females. The Marine Corps' Training and Education Command (TECOM) published an online training package to assist females and their commanders change their individual and unit training programs to accommodate. I've provided a copy of that training program, it's TAB A. This training program was published to complement the 5 combat conditioning sessions per week, of at least 30 minutes per session.

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9. How easy or difficult do you believe developing upper body strength is for men and/or women in different age brackets? (use age brackets 18–21, 22–27, 28–35, 36–42, 42–50 as examples)

Thank you for your time! I truly appreciate your time and input to assist my research efforts for my thesis.

LIST OF REFERENCES

Assistant Secretary of Defense (FMP). (2002, November 5). DOD physical fitness and body fat programs procedures. (DODI 1308.3). Washington, DC: Author.

Bureau of Land Management. (2014, February). *Firefit program*. Retrieved from National Interagency Fire Center (NIFC) website: <http://www.nifc.gov/FireFit/index.htm>

Commandant of the Marine Corps. (2002, May 10). Marine Corps physical fitness test and body composition program manual. (MCO P6100.12 W/CH1). Washington, DC: Author.

Commandant of the Marine Corps. (2008a). Changes to the Marine Corps physical fitness program (ALMAR 032/08). Washington, DC: Author.

Commandant of the Marine Corps (2008b). Marine Corps physical fitness program. (MCO 6100.1 w ch1). Washington, DC: Author.

Commandant of the Marine Corps. (2008, October 23). Combat fitness test (CFT) advisory 01-09 (MARADMIN 608/08). Washington, DC: Author.

Commandant of the Marine Corps. (2009, August 10). Change 1 to marine corps physical fitness program order and implementation instructions for combat fitness test scoring system (MARADMIN 0476/09). Washington, DC: Author.

Commandant of the Marine Corps. (2010, April). USMC numerical index of military occupational specialties (NAVMC 1008-A). Washington, DC: Author.

Commandant of the Marine Corps. (2012a). Assignment of women to ground combat units (ALMAR 012/12). Washington, DC: Author.

Commandant of the Marine Corps. (2012b). Marine air ground task force (MAGTF) command element (CE) training and readiness (TR) manual. (NAVMC 3500.116). Washington, DC: Author.

Commandant of the Marine Corps. (2012c). Change to the physical fitness test (ALMAR 046/12). Washington, DC: Author.

Commandant of the Marine Corps. (2014, January 24). Change to the physical fitness test timeline modification (MARADMIN 035/14). Washington, DC: Author.

Commandant of the Marine Corps Manpower and Reserve Affairs (M&RA MM). (2009, September 18). Change 1 to MCO P1610.7F, performance evaluation system, and interim guidance pending change 2 to MCO P1610.7F for combat fitness test reporting on fitness reports (MARADMIN 0570/09). Washington, DC: Author.

Commanding General. Marine Corps Combat Development Command (WF 06). (1988, January 29). Marine physical readiness training for combat. (MCRP 3-02A). Quantico, VA: Author.

Easter, W. (2009). *The Marine Corps PFT: Not equal, not fair* (Expeditionary Warfare School). Retrieved from DTIC Online website: <http://www.dtic.mil/get-tr-doc/pdf?AD=ADA517772>

McGuire, B., Vickers, Jr., R. R., Reynolds, J. H., Curry, A., Bockelman, T., & Massimo, R. (2011). *Examination of pull-ups and push-ups as possible alternatives to the flexed arm hang on the Marine Corps physical fitness test*. (Report No. 11-21). San Diego, CA: Naval Health Research Center. Retrieved from DTIC Online website: <http://www.dtic.mil/get-tr-doc/pdf?AD=ADA554498>

Military Personnel Overview: Prepared statement of the Honorable Clifford L. Stanley, under secretary of defense (personnel and readiness) before the house armed services military personnel subcommittee. 112th Cong., 1st Sess., (2011) (testimony of Honorable Clifford L. Stanley). Retrieved from Department of Defense website: <http://www.dod.mil/dodgc/olc/docs/testStanley03152011.pdf>

Miller, A. E., MacDougall, J. D., Tarnopolsky, M. A., & Sale, D. G. (1993). *Gender differences in strength and muscle fiber characteristics*, 66(3), 254–62. Retrieved from National Center for Biotechnology Information website: <http://www.ncbi.nlm.nih.gov/pubmed/8477683>

Office of the Under Secretary of Defense, Personnel and Readiness. (2012). *Report to congress on the review of laws, policies and regulations restricting the service of female members in the U.S. armed forces*. Retrieved from GlobalSecurity.org website: <http://www.globalsecurity.org/military/library/report/2012/wisr-report.pdf>

Plowman, S. A., Sterling, C. L., Corbin, M. M., Welk, G. J., & Morrow, Jr., J. R. (2006) *The history of FITNESSGRAM. Journal of Physical Activity & Health*, 3(2), S5-S20. Retrieved from FitnessGram website: <http://www.fitnessgram.net/history-development>

Posey, M. J. (2005). *Shattering the pull-up myth* (Contemporary Issues paper, Expeditionary Warfare School). Retrieved from DTIC Online website: <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA505547>

Sturgeon, J., & Meer, J. (2006). *The first fifty years 1956–2006*. Retrieved from Presidential Fitness website: <http://www.fitness.gov/pdfs/50-year-anniversary-booklet.pdf>

USMC female PFT (FPFT). (n.d.). Retrieved from USMC Fitness Readiness Guide website: <https://fitness.usmc.mil/FPFT/default.aspx>

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